WATER RESOURCES

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OF MICHIGAN

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MAIN
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HEARINGS

BEFORE THE

SELECT COMMITTEE ON NATIONAL WATER RESOURCES UNITED STATES SENATE

EIGHTY-SIXTH CONGRESS

FIRST SESSION

PURSUANT TO

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WATER RESOURCES

TUESDAY, DECEMBER 8, 1959

U.S. SENATE,
SELECT COMMITTEE ON NATIONAL WATER RESOURCES,
Boston, Mass.

The select committee met at 9 a.m., pursuant to Senate Resolution 48, in courtroom No. 5, Federal Building, Senator Robert S. Kerr, presiding.

Committee members present: Senators Kerr, Hart, and Moss.

Also present: Representative McCormack.

The CHAIRMAN. Speaking for myself and my colleagues on this committee, I want to tell you that we are happy to be here in Boston. We had heard that there were those in Boston who considered it the hub of New England, but I want to tell you the way they treated us I am about to vote for it as the hub of the universe.

We have never been treated more kindly and courteously. Even the press was generous with us.

And that made the evening just about perfect. The representative of the Governor met us, extended the courtesies of his office, told us of the operation his fine wife had had and we were deeply sorry not to be able to see him. Senator Kennedy's office performed, I would say, on the basis of par for any course. If Bill Hardigan ever decides to take up citizenship in Oklahoma I sure could use that guy.

I believe it was Joe Gallagher from the Governor's office who was so very kind to us. Lieutenant Governor Murphy developed in our mind a new respect for that office. He established himself as a fine friend of the men and unusually effective even for an Irishman who charmed the women present and all in all did a marvelous job for us, and we hope that it might be the same for Massachusetts.

Your State chairman of the Democratic Party, Pat Lynch, was very kind, and then—what county is this—Suffolk. Now I thought I had better get that straightened out. There is a sheriff there from Middlesex. He made me an honorary sheriff, and then he made Senators Frank Moss and Phil Hart honorary sheriffs. And we told him that he is going to have to be a mighty strong man to ride herd on us while we are on his staff.

We certainly have been royally treated here. We are happy to be in the great State of Jack Kennedy, one of the most gracious and able men of the Senate, at whose invitation we are here today. I have a letter from him expressing his regrets at being unable to be here, which I will include with his statement.

We are happy to be in the home State of Leverett Saltonstall. All I can say about him is if you have got to send a Republican to the U.S. Senate, I do not know how in the world you can beat him.

He was Governor of Massachusetts when I was Governor of Oklahoma. I came here in 1944 on a secret mission, found out that John Bricker of Ohio was here on a similar mission. He was keynoting the Republican State convention and I was keynoting the Democratic State convention.

If there was the slightest difference in the courtesies extended the two of us by your distinguished Governor, Leverett Saltonstall, John never did disclose it and I never did discover it.

This committee has the assignment given it by the Senate to ascertain the water needs of this dynamic growing Nation over the next two decades in order that the requirements for those two periods may be met and that we may then be ready to move into the job, meeting the even greater assignment with reference to water resources ahead of that.

Our population is growing at a tremendous rate. Experts in the Census Bureau tell us that within the next 20 years it will increase 75 million, that during that period of time or very little more our gross national production of industrial and agricultural output will double. In view of the fact that many areas of the Nation are already feeling the pinch of water shortage it is apparent that for us to be able to meet the objectives ahead of us we must do a more complete job of water conservation.

We seek the necessary information to advise the Senate on what the needs of our country will be in these two decades, where the water is available with which to meet those needs, what measures of conservation and reclamation will be necessary to as nearly as possible avoid the shortages and fix it so that every State may have its best opportunity to participate in the tremendous development ahead.

It is our judgment that the greatly expanded industrial workshops of the future will be in the areas that both have and conserve the water and the greatly expanded agricultural production will be in the areas where the soil is available, where it is conserved, and where the water is at hand that will be necessary to meet that goal. I am happy that here with me is the distinguished junior Senator from Michigan, Senator Phil Hart, one of the ablest Members of the Senate, one of the fine members of this committee, who gave us one of the best hearings we had down at Detroit.

(The letter and statement of Senator Kennedy follow:)

U. S. SENATE,
Washington, D.C., December 5, 1959.

HON. ROBERT S. KERR,
Chairman, Select Committee on Water Resources,
U.S. Senate, Washington, D.C.

DEAR SENATOR: I am sorry that a conflicting engagement makes it impossible for me to testify personally before the Senate Select Committee on Water Resources. I would, however, appreciate it if you would arrange to have my statement, which I am enclosing, included as part of the record of the hearings held in Boston on December 8.

With kind regards,
Sincerely,

JOHN F. KENNEDY.

STATEMENT OF HON. JOHN F. KENNEDY, U.S. SENATOR FROM THE STATE OF MASSACHUSETTS

I am grateful for the opportunity the Select Committee on Water Resources has afforded those of us who are interested in the full development of our Nation's water resources to testify upon this problem.

Although each section of our Nation has a special interest in our water resources, we all have a common concern over its proper utilization. The differences consist largely of differences in emphasis upon hydroelectric power where there are energy shortages, emphasis upon flood control where this is a recurrent hazard, emphasis upon irrigation and reclamation in arid regions, or emphasis upon conservation and recreation when the land is conducive to this method of exploitation. Although we have had many studies on water problems—I believe there have been 20 in the past 50 years—we are still without a national water resources policy. Although there have been sporadic efforts by Federal, State, and interstate governmental agencies to meet particular crises as they arise, there has been little effort to meet our long-term needs. At present we suffer from a leadership vacuum. I believe this committee is performing an extremely valuable service in calling attention to these matters.

It is important for us to remember that water resources are inextricably related to our energy requirements, our timber conservation, our agricultural resources, and our industrial development. They constitute an important factor in our race with Russia for economic and industrial supremacy. For instance, I regard the construction by Russia of high-power long-distance transmission lines which are still on the planning boards of our own engineers as a warning. We cannot rely upon past achievements to maintain our industrial advantage.

We cannot begin to make plans 20 or 30 or 40 years from now, when disaster may threaten. We must begin now.

In New England, power, flood control and adequate protection against water pollution are most crucial to our commercial and industrial expansion. As a high-energy cost area, we need additional power sources. The cost of power per unit is 62 percent higher in New England than elsewhere in the country, 73 percent higher than in North Carolina, and 334 percent higher than in Tennessee.

I should like to stress five principles which I believe should be embodied in any water resources program.

1. *Steps should be taken to implement the report of the International Passamaquoddy Engineering Board.*—Soon after I took my oath of office as Senator, nearly 7 years ago, I urged an immediate study of the economic feasibility of harnessing those huge tides which surge and recede every day through Passamaquoddy and Cobscook Bays. I said then that such a study was urgently needed if we were to plan and prepare for the pressing power needs of Maine and all New England. And it is clear from this report that to cap this fantastic flow of 70 billion cubic feet of water each day would be a tremendous spur to the economic growth of Maine, of New England, and of the entire United States.

2. *There is a compelling need for a continuing agency of Cabinet-level standing with responsibility for overall policy and coordination of all resources and conservation activity.*—The surge of demand for additional energy, water, irrigation, and recreational sites will soon overtake all present and planned projects. All our oil resources, our coal resources, our hydroelectric resources, and our atomic energy resources will be needed. But there has been little effort to organize these interrelated demands into a comprehensive program. We find atomic energy plants being constructed next to coal mines. In short, we are drifting when we should be steering.

3. *We must pay increased attention to the problem of water pollution.*—The availability of clean water is of importance not only to our health and living standards but to our industrial development as well. The early growth of New England was possible because there was plenty of good water available. Today pollution is the largest single destroyer of New England water resources, hindering the economic health and prosperity of the region.

For every dollar of Federal funds, it is estimated that $4.50 of local funds are spent. Our minimum requirements to take care of the backlog we have accumulated to provide for population growth and to replace obsolescent plants are $600 million a year. It is, I think, apparent that the fullest development of our water pollution program now requires that Congress provide adequate appropriations to carry out the purposes of the Water Pollution Control Act. Tax amortization incentives for industrial waste-treatment plants would also be helpful.

4. *We must embark upon a crash program of finding ways to cheaply convert salt water and brackish water to fresh water.*—This is one of man's age-old dreams. But it is more than a dream. It is a necessity. The nation that first

develops this process will win the everlasting gratitude and respect—if not control—of all the arid, poverty-stricken nations bordering the Mediterranean, the Indian Ocean, and the African coast, among others. Although we now have an adequate supply of fresh water in the East, studies indicate that the East, as well as the West, will be in desperate need of fresh water in 30 to 50 years.

5. *We should implement the Flood Insurance Act with a practical program.*—It is unfortunate that this legislation has been allowed to wither for lack of appropriations. I hope it is not necessary for us to experience the severe hardship of another disastrous hurricane to spur an appropriation.

In conclusion, may I say that the water resources of New England and the United States are a most precious treasure, much of which we have failed to use properly. We cannot afford to underestimate the importance of their development to the economic well-being of our citizens and to the fullest utilization of our productive capacity.

The CHAIRMAN. Senator Hart, have you any comments?

Senator HART. None, except to report to the chairman why I was late. I thought in this city there would be no difficulty. I had to go to church this morning, Mr. Chairman, and I got lost on the way back.

The CHAIRMAN. You see, in my church we are lost before we go to church but after we get there then we are not lost anymore.

I want to tell you right now you better think that over. If you are lost after you go to church I want to talk to you.

Well, it is amazing either that Phil Hart would get lost anywhere or that you would have any trouble finding the tallest Federal building I ever saw, after the very sobering experience of going to church.

Senator HART. Those narrow streets.

The CHAIRMAN. We have one-way streets in Oklahoma. You know what Will Rogers said when he started out the first time he got on one. Actually he just wanted to go to the county courthouse but he was on the street north of it and had to go to El Reno before he could make a turn.

Utah is one of the States where they have learned about water conservation the hard way. One of the great advocates of conservation out there has been Frank Moss, the junior Senator from Utah, one of the members of this committee.

Senator Moss, have you any comment?

STATEMENT OF HON. FRANK E. MOSS, U.S. SENATOR FROM THE STATE OF UTAH

Senator Moss. Mr. Chairman, I want to confirm what you said in the beginning about the reception and the hospitality that we received here in Boston and in Massachusetts. It has been heartwarming indeed. We are very pleased to be here to hold this hearing.

We had a very excellent hearing in Augusta, Maine, yesterday, and we are looking forward to equally enlightening testimony today.

I have not had the opportunity of visiting this part of the Nation very much. I have just been through here a time or two. So I am thoroughly enjoying spending a little more time, getting better acquainted with the people and learning a little bit more about your resource problem.

What the chairman said about the problem of water is obviously a nationwide problem. It varies a little in emphasis from place to place.

In Utah we have to save every drop of water we can get our hands on in any way at all because we do not have enough.

Some places have too much, but for that reason have not taken care of it very well and now find they are turning the corner into the shortage area. All of these things dovetail together to make a national picture. That is what we are trying to learn on this committee, what the national picture is and then project our thinking ahead.

It has been the history of our public acts, I think, to not always look far enough ahead and in not planning for a long enough view. We hope to be able to raise our sights and to look ahead at least two decades, and possibly beyond, in attacking this water problem. I am very pleased to be here this morning.

The CHAIRMAN. Thank you, Senator.

I want to also express the appreciation of every member of this committee and its staff to the very efficient and courteous State and city police. I always want them on my side. I will tell you that.

We have here this morning representatives of various departments, U.S. Government agencies.

Is Mr. Norman R. Tripp, Chief, Section of Land-Use Plans and Watersheds for the northeastern region of the Department of Forest Service here?

Mr. TRIPP. Yes, sir.

The CHAIRMAN. We are glad to see you, Mr. Tripp.

Mr. Newcomb, supervisor of the Green Mountain National Forest. Is there a representative of the Soil Conservation Service here?

What is your name, sir?

Mr. ISGAR. Benjamin Isgar. I am State conservationist for the State of Massachusetts.

The CHAIRMAN. Glad to have you, sir.

The great Corps of Engineers is represented here by one of its able brigadier generals, Alden K. Sibley, division engineer for New England.

General Sibley, we are glad to have you sir. Will you tell us who is with you and from your office?

General SIBLEY. I have, Mr. Chairman, Mr. John Leslie, the chief of the engineering division of our office; Mr. John Dingwall, in the engineering division, and Colonel Karl Eklund, deputy division engineer, of the Corps of Engineers, who will remain on this afternoon, sir.

The CHAIRMAN. We are very glad to have you gentlemen.

Representing the Department of Health, Education, and Welfare, the Public Health Service, is Mr. Robert C. Ayers of the headquarters staff, and Lester Klashman, of the New York regional office.

Gentlemen, we are glad to have you here.

Mr. AYERS. Thank you, Senator.

The CHAIRMAN. Yes, sir.

They have been attending these hearings nearly as regularly as we have, and we appreciate it.

The Department of Interior, Bureau of Sport Fisheries and Wildlife—is a representative from the Boston regional office here?

Mr. WEBER. Yes.

The CHAIRMAN. Good. What is your name?

Mr. WEBER. Mr. Weber and Mr. Bailey.

The CHAIRMAN. Bailey?

Mr. WEBER. Bailey and Weber.

The CHAIRMAN. Thank you, gentlemen; we are glad you are here.

The Bureau of Commercial Fisheries, a representative from the Gloucester regional office.

Mr. HOYD. Dwight Hoyd.

The CHAIRMAN. Did I pronounce that word right—Gloucester?

Mr. HOYD. That is Gloucester.

The CHAIRMAN. I hope while I am here I will either learn to spell it or pronounce it.

I would like to present to this kind group of people our staff. Much of the work and much of the brains, is done and provided by the staff. We have a great staff with this committee and they are going to be largely responsible for what degree of success we achieve in meeting our mission.

Is Ted Schad here, the staff director? Mr. Schad. Will you identify and present the other members of the staff that are here, Mr. Schad?

Mr. SCHAD. I want to say that when we have a group of people like Senator Kennedy's staff and supporters, and the Governor and his staff here to help us with the arrangements it is not much of a job to come up here and have a hearing. They do all the work and I do not want to take any credit for that. We hope to be able to make good use of the record of the hearing when we get it.

As for the committee staff, we have our chief clerk with us, Mr. Paul McBride, the man who just went out the door.

We also have with us Mr. Phil Dickinson of Senator Engle's staff.

The CHAIRMAN. Tell them where Senator Engle is from. He is on a secret mission but——

Mr. SCHAD. What is that State?

Mr. DICKINSON. I have forgotten. It is west of Nevada.

The CHAIRMAN. Oh, California—California.

Mr. SCHAD. We have Miss Muriel Ferris of Senator Hart's staff who has been helping with this hearing, and Bill Welsh, Senator Hart's administrative assistant.

And we have Doyle Kline, press assistant to Senator Anderson of New Mexico.

And we have Gene Eaton of the Interior and Insular Affairs Committee staff, and Johnny Mutz of the Public Works Committee staff; and Ada Lenz, secretary to Senator Kerr—who is helping us with the work for these hearings.

And for the record, our reporter is Frank Smonskey with the Alderson Reporting Co. of Washington, D.C.

The CHAIRMAN. Thank you very much, Ted.

I believe that Mr. Clarence Sterling, the director and chief engineer of the water resources engineer division, is to be our first witness this morning.

Mr. Sterling, would you come forward and give us your statement?

Are you prepared to present the other witnesses representing your agencies?

STATEMENT OF CLARENCE STERLING, DIRECTOR AND CHIEF ENGINEER, MASSACHUSETTS WATER RESOURCES COMMISSION

Mr. STERLING. I think most of them are here. So I would be glad to present them.

The CHAIRMAN. Very good sir.

Mr. STERLING. Do you want me to present them?

The CHAIRMAN. Give us your statement and then present them as they are ready.

By the way, we are hopeful that some of the Members of the House of Representatives from Massachusetts may be here. If they are in the room I would like to know it and if not I would like to be advised when any of them arrive.

We think a great deal of all of them and especially of John McCormack, who not only represents Massachusetts but we think, a great deal of the whole Nation.

All right, Mr. Sterling.

Mr. STERLING. I might say at the beginning, Senator, that we are very happy as the host State here to welcome you and the other members of your committee to Massachusetts. I am glad to see that Senator Hart was able to see our city even inadvertently and I hope that he and possibly Senator Moss, whom I understand is going down to the cape tomorrow to enjoy some other parts of the State, will continue to have an enjoyable time.

The only reason I am speaking here this morning is that we recently—when I say recently I mean about 2 years ago—organized a water resources commission to try to coordinate some of the problems you are trying to coordinate at a national level.

Our resources commission was made up of the six commissioners who had responsibilities in the departments for water supply just as in the Federal Government you have a number of agencies doing the same thing, and three public members to get some nongovernmental viewpoints into the picture; and we have been endeavoring to coordinate our activities in the water resource field.

Actually, it has been helpful just to have the members and the commissioners sit down together to discuss problems. We do not ordinarily have cabinet meetings in the State and sometimes it has been the first time that one commissioner has met another commissioner, and it has been very helpful to have this type of commission.

Massachusetts on the face of it looks like a pretty well-watered State. We have a rainfall that averages about 45 inches and we also have the benefits of the stream flows from rainfall in Vermont and New Hampshire through the Connecticut River and Merrimac River. Occasionally, however, we have had too much rainfall from those States and that has led to the Corps of Engineers' program of flood-control reservoirs in our New England States.

Even in little Massachusetts we have put in 11 flood-control reservoirs or rather the Corps of Engineers has put in 11 flood-control reservoirs or are in the process of construction or being installed.

So we are very aware of our water problems.

Actually, our State, which has probably been developed industrially, was due to the fact that we had so much water originally, both for power, industrial purposes, and for transportation.

Then, as our industries changed, and they are changing in this century, where a lot of our textile industries are moving to other localities and changing our picture insofar as water use is concerned, we are getting a different type of industry coming into the area which are relatively small water users, but still our water consumption keeps increasing.

At the present time our domestic water use in our cities and towns, which has some 275 water systems, is about 600 million gallons a day. Of that, about 210 million gallons a day are used right here in the Boston metropolitan area.

The CHAIRMAN. I wonder if you would stop just there 1 minute.

Mr. STERLING. Surely.

The CHAIRMAN. You say the State's use for domestic purposes is——

Mr. STERLING. 600 million gallons a day. This is for domestic water consumption.

The CHAIRMAN. What is the total population of Massachusetts?

Mr. STERLING. The total population of Massachusetts at the present time, I think, is around 4,800,000.

The CHAIRMAN. In other words, about 125 gallons per capita per day.

Mr. STERLING. That is right.

The CHAIRMAN. For domestic uses?

Mr. STERLING. That is about right.

The CHAIRMAN. Thank you.

Mr. STERLING. As the rate of consumption and per capita consumption is increasing, we estimate that by the year 1980 we will probably be using around 900 million gallons a day for domestic use. We even projected further than that. In the water works business you are usually building 30 or 40 years in the future.

By the end of the century we think we will be using a billion gallons of water per day for domestic use.

Our present sources of water supply for domestic use as developed now has the safe yield of about 800 million gallons a day. That does not mean that we have all the water we want in the right places.

We have just the same problems you have in other parts of the country. We have excess water in one locality and scarcity in another.

In 1957, which was a very dry year here, we had some 65 water systems that were in trouble because of lack of water at the sources. We are endeavoring to help those communities to get additional water sources developed.

In regard to our industrial water use it is roughly about two times the present domestic water use. When I say industrial water use, I mean for manufacturing purposes. That does not include water that is used for powerplants, and so forth, which is not a real use but just a recirculation through the plant.

In recent years we have had another use that has come to us which we had not before which you and in your part of the country are very familiar with, but in our part of the country we have not been—that is use of water for irrigation purposes. We have probably less total acreage in use each year but our agricultural methods have changed so that we find that watering is very important even in the State that has even water distribution.

At the present time we have about 26,000 acres of land that are under irrigation. That includes about 5,000 acres of cranberry bogs, if I can mention the word at the present time. We hope we continue to have cranberry bogs and we continue to have 5,000 acres under cultivation. We anticipate that we will not have more land put into cultivation in the future because a lot of our agricultural land is being used for industrial homesites subdivisions. But we think that more agriculturalists will use water for irrigation.

The CHAIRMAN. That is, more of your land will be irrigated.

Mr. STERLING. That is right. We are anticipating by the year 1980 there will be somewhere around 55,000 acres of land which, with our rainfall and water usage, will have a seasonal water usage of about 15 billion gallons.

I might say one thing, first, in Boston's metropolitan water system that system was designed in the year 1895 and we are one of the few metropolitan areas that have an adequate water supply so far as source is concerned. I am illustrating this. I am pointing this out just to illustrate the farsightedness of engineers back in 1895 who designed that system.

The CHAIRMAN. I wonder if I could interrupt there.

Mr. STERLING. Yes, sir.

The CHAIRMAN. Does the fact that you are now greatly impressed by this foresight and the great asset that you have here mean that it constitutes a strong stimulant to us of this decade to use the same kind of foresight with reference to the requirements 20 and 40 years from now?

Mr. STERLING. Senator, that is what I was leading up to.

The thing that has amazed me, however, is the fact that those engineers in 1895 were able to convince the legislature of the need to put up big sums of money. They were more persuasive engineers than I and they were my predecessors as chief engineers in this State.

But the metropolitan water system is probably adequate until the end of this century as far as sources of supply are concerned. But I wish I had that same power to interest our own legislature on the need for future planning.

Like in other States, and I am sure at the Federal Government level, so much of the planning is done after emergencies. We have programs that are started by State agencies and by Federal agencies only when we have a national catastrophe or we have a regional catastrophe. Unfortunately, the rainfall this year has been pretty normal and we have a terrible time in our budget. If we had a flood or drought we would fare much better, but it is not very good for long-range planning, and that is all really a water resource commissioner is supposed to be doing, that is, long-range planning for the region.

I would like to point out a few things which I have put into my statement, but I would like to emphasize a little more, if I may be permitted the time.

We can only have the best development of our water resources if we work together at both the Federal and the State level. We are all representatives and servants of the people of the country. You have heard that many times. I repeat it again for emphasis.

The CHAIRMAN. If you think they are not interested in it you just quit saying it for a while.

Mr. STERLING. I am glad there are so many people interested.

The CHAIRMAN. Yes, sir.

Mr. STERLING. We have been fortunate in this State, for example, to have the League of Women Voters undertaking the national water resource project. It has been a big lift to us to have the public feel somebody is doing something, and also you as a Government servant are having some backing from the people.

The thing I would like to point out, however, to your committee is that the water resource problem cannot be solved—it is going on from year to year. It is a dynamic thing. It is not static. We never have an ultimate plan. Changing conditions change it.

But what I would like to point out is that your program at a national level will never be any better than a program at the State level or the regional level.

One of the things in the Federal programs, I feel, is that we need aid to get the State water resources commission, no matter what you call it, off the ground very often. We have a lot of local shortsightedness in long-range planning. A stimulus from the Federal Government in aiding the water resources commission in the various States would be very helpful.

For example, in the Department of Health, Education, and Welfare, under the stream pollution program they have grants-in-aid for administration to the State water pollution control agencies which are very helpful in stimulating the pollution control program in this State. I am sure the same thing is occurring in other parts of the country.

The CHAIRMAN. Has the response here to that Federal program been vigorous?

Mr. STERLING. Yes, it has been vigorous. We have somebody who will talk on that point later on.

The CHAIRMAN. I see. Go on.

Mr. STERLING. It has stimulated the community to no end. The commission itself is trying to assemble basic data. We find that if we do not have the basic fact in front of us it is very difficult to present the correct picture to a legislature, and I feel that we are not doing a good job unless we have the facts to base our political decisions upon. So we need more help in measuring our basic resources. For example, a State like Oklahoma I am sure, has a State geologist and has its geological assets pretty well mapped out. In this State we have no State geologist. We are only starting to scratch the surface for finding our ground water resources which I think are a very important factor for the future development of our water supply.

At the present time we are doing a cooperative program with the Geological Survey on a 50–50 basis, but actually that taps a lot of money we have available for other water resource programs. We wish that either the ratio could be changed or we would just have more money available for administration of the other phases of our program.

The other thing I would like to point out is that frequently the programs that are enacted by Congress get bogged down in administrative determination in many of the departments that have the responsibility for the program. We find out that in some of the Federal programs, as far as I can see, there is nothing wrong with the basic law but the various decisions that are made by administrative agencies are made either by the agency or by some of the outside agencies over which the supervising agency has no control, and I mean the Bureau of the Budget and the Department of Justice, and so forth. Very often it has bogged down our program, programs that we think are worthwhile and which you people think are worthwhile and we have not been able to carry them out.

I will not go into any more detail at this time. I just wish to say two other things.

There will be experts talking about the northeastern resource compact. We in Massachusetts are greatly in favor of the northeastern resource compact. We hope Congress will approve it.

The other thing I would like to mention is the fact that we are not making a pitch for any one overall Federal agency. We would like to work together with the State agency and coordinate the program between the States and the Federal agencies. We think it would be easier, however, if there was a coordinating agency at the Federal level, not necessarily to take over the functions of the various departments but——

The CHAIRMAN. To coordinate?

Mr. STERLING. To coordinate, something like along the Ice Water setup we have now, but with a staff that can really do a job and not just a part-time job where you meet—I do not know what the meeting rate is—but either once a week or once a month. We think that kind of an organization would be very helpful in assisting us in developing the best type of programs for the area.

Unless you have some particular questions from me I would like to introduce some of our people.

The CHAIRMAN. Fine.

I notice you have an extended statement and, if there is material in it that you have not covered, we will have it made a part of the record.

Mr. STERLING. Thank you very much, Senator.

(The prepared statement referred to follows:)

MASSACHUSETTS WATER RESOURCES DEVELOPMENT

Statement by Mr. Clarence I. Sterling, Jr., director and chief engineer of the Massachusetts Water Resources Commission

PART I. STATUS OF WATER RESOURCE DEVELOPMENT

The availability of water in Massachusetts has been one of the most important factors in the industrial development of this Commonwealth. We have been fortunate in having an abundance of water of naturally good quality for domestic water supply purposes, industrial water usage, the development of water power to operate our mills, hydroelectric projects, and for recreational and agricultural purposes.

Background statistics

We have an average annual rainfall of 43 inches in comparison to the national average of 23 inches. In a wet year it may be as high as 60 inches while in a dry year it may be as low as 30 inches. More fortunate is the fact that the rainfall is fairly uniform throughout the entire year. Approximately 45 to 55 percent of the rainfall flows to the sea in our 4,230 miles of streams. However, Massachusetts is doubly blessed for it receives the streamflow of the Merrimack and Connecticut Rivers resulting from rainfall in Vermont and New Hampshire. There are 254 square miles of water surface in this State and a total land surface of 7,875 square miles. The water area is made up of about 1,215 great ponds (a great pond is a natural pond with an area of more than 10 acres) having an area of about 153 square miles, the remaining area consisting of small ponds of less than 10 acres and artificial reservoirs.

Evaporation studies made by Fitzgerald many years ago showed that 39 inches is lost annually from water surfaces by evaporation, which is approximately 90 percent of our average rainfall.

Present domestic water usage

In the year 1957, 217 cities and towns of the 273 municipalities having water supply systems reported that their average daily water consumption was 565 million gallons per day. The consumption for all 273 municipalities would be approximately 600 million gallons per day, about 35 percent of which were supplied by the metropolitan water district serving Boston and the surrounding area.

The average daily water consumption figures do not furnish a complete story of the demands that are being made upon the water systems. The water consumption for the maximum day might vary from 125 to 250 percent of the average daily water consumption. The average daily flow during the week of maximum consumption gives a better indication of the sustained peak demand that might be made upon a water system. This is frequently 10 to 15 percent less than the flow for the maximum day. The estimated safe yield of our present sources of water supply is about 800 million gallons per day. However, available water is not always in the locality where it is needed. During the 1957 drought there were 63 municipalities that had to curtail water usage because of inadequate supply.

Further statistical data in regard to present water usage and future needs will not be repeated here but it will be found in the three following legislative reports, copies of which have been submitted to your committee: Senate 665 of 1957, Senate 695 of 1957, and House 2791 of 1959.

Changing water usage

In the early days the waters in our streams were utilized to operate grist and saw mills. Later, water became an important factor in the industrial age with the establishment of the textile, paper, and tanning industries in Massachusetts. Prior to the advent of railroads, our streams and rivers were used for navigation purposes and a system of canals was constructed in various parts of the State to provide transportation. Today an additional demand has been placed upon our water resources with the increased use of water for domestic purposes, the development of sport fishing and other recreational pursuits, the need for water for irrigation, and the continued use of large quantities of water by industries. Probably last, but not least, is the use of our streams for carrying away treated and untreated domestic sewage and industrial wastes.

Future water needs

A conservative estimate of Massachusetts' population in the year 1980 is 6 million. One study estimated that the population by the end of the century would be 7 million persons in round figures. With the ever-increasing per capita use of water required by our improved standard of living, we now estimate that our domestic water consumption may be as high as 900 million gallons per day by 1980 and over 1 billion gallons per day by the year 2000.

By the year 1980 our industrial water consumption may be about 1¼ billion gallons per day and nearly 1½ billion gallons per day by the year 2000.

The use of water for the irrigation of agricultural lands is increasing rapidly. In the year 1957, 26,530 acres were under irrigation, 5,000 of which were for the growing of cranberries. If the use of water for irrigation purposes increases at its present rate, by the year 1980 there will be 55,000 acres of agricultural land under irrigation, with an estimated seasonal consumption of 15 billion gallons.

Other water problems

While the above figures reflect Massachusetts' future water needs, this State has at times been overblessed with water. We have been subjected to a number of disastrous hurricanes and floods in the past three decades. It was found that flood protection could be obtained in a number of the river valleys by the construction of flood-control reservoirs in the upstream States. This led to the mechanism of the use of interstate compacts between the various New England States. At the present time, Massachusetts is a member of three such interstate flood control compact groups.

In spite of its small area, Massachusetts has agreed to the construction of 11 flood-control reservoirs under the Corps of Engineers' flood-control program for its own protection and the protection of the States of Rhode Island and Connecticut.

In the field of pollution control similar action was taken when Massachusetts joined with the other New England States and New York State in an interstate

pollution control compact. The use of the mechanism of the interstate compact has been very successful in carrying out the objectives of those compacts.

Coordination of State program

Throughout the years a number of State agencies have been entrusted with the responsibility of supervising the various aspects of water usage. A similar situation has developed in the agencies of the Federal Government. With the increased public interest and the need for better cooperation between the Federal and State agencies, it became necessary to establish a coordinating body at the State level to present a unified viewpoint to assist the various Federal agencies in determining Massachusetts' needs.

As a result, the legislature passed chapter 620 of the acts of 1956, which established the Massachusetts Water Resources Commission. This nine-member Commission consists of the heads of the six State agencies having responsibilities for water usage plus three public members appointed by the Governor. The act provides that the Commission shall be the agency of the Commonwealth responsible for the coordination of the activities of the Federal, State, and other agencies in the conservation, development, utilization, and disposal of water insofar as preventing the loss of life and damage of property by erosion, flood waters and sediment in the watersheds of the Commonwealth is concerned. In addition to its coordinating functions, the Commission was named the agency for carrying out the Commonwealth of Massachusetts' responsibility under the Small Watershed Protection Act, Public Law 566 of the 83d Congress. It was also given the responsibility of compiling basic data and making studies for the most optimum water resource development.

The Commission's program, in addition to its coordinating function, is as follows:

(1) To maintain over 100 rainfall stations, exchanging the data with the U.S. Weather Bureau.

(2) To cooperate with the U.S. Geological Survey in a stream gaging program.

(3) To cooperate with the U.S. Geological Survey in ground water resource studies in certain areas.

(4) To make available geological maps adapted especially for ground water development.

(5) To make water resource studies in certain river valleys as instructed by the legislature. These are now being conducted in the Quaboag, Ware, Quinebaug, Merrimack, and Concord River valleys.

PART II. FUTURE NEEDS

Philosophy on water resource development

We look upon the water resource development as a dynamic program; one that has certain aims and obligations but not a fixed course of action for attainment. Frankly, it is not always possible to understand what is meant by a national water policy as the policies and practices that have developed in various parts of the country have been a natural evolution resulting from regional environment, tradition, and necessity. We feel that water resource problems should be dealt with at the lowest possible governmental level where technical staffs are available. To be successful, solutions must be thoroughly understood by the public that is affected by the particular problem. We believe that the continuing use of the interstate compact mechanism has been a satisfactory one for Massachusetts and the other New England States.

The most comprehensive study of natural resources ever undertaken in the New England area was the study made between 1950 and 1955 by the New England-New York Interagency Committee (NENYIAC) which was financed by the Federal Government. The report gave an inventory and blueprints for the future development of the New England resources. A brief summary updating some of the facts pertaining to Massachusetts contained in that report is attached (Some Basic Facts About the Natural Resources of Massachusetts, May 1958).

In 1956, the New England Governors' Conference established in cooperation with the Federal Government a Northeastern Resources Committee to implement the work and recommendations of the NENYIAC report. It was subsequently found that the work of this committee could be more effectively carried out by the use of the interstate compact mechanism. As a result, there was recently enacted in Massachusetts legislation to permit us to join with the other Northeastern States in the so-called northeastern resources compact for the de-

velopment of water and related land resources. We recommend that Congress give its early approval to that compact.

Federal policies which should be evaluated

The water resource agency is a small one; newly born, inadequately financed, and understaffed. In trying to coordinate the activities of the Federal and State agencies, it has encountered certain problems and practices of the Federal agencies which it believes should be re-examined. Some of these difficulties are due to the provisions of the Federal legislation authorizing water resource programs, but many of them are due to rules and regulations of the agencies carrying out the programs or rulings of the Bureau of the Budget and, in some cases, opinions of the Department of Justice or the General Accounting Office.

We feel that, in order to have a successful water resources development program in the country, there should be a strengthening of the State water resources agencies' activities as the success of the Federal programs is dependent upon the State programs. Possibly this could be accomplished by the use of grants-in-aid to the State water resource agencies similar to the grants now being made available by the Department of Health, Education, and Welfare in the various States for the administration of the water pollution control program.

We feel that there is a need for placing the various Federal programs on the same basis insofar as policy is concerned. At the present time each Federal program is operating under a special act containing different provisions which limit the actions of the agency responsible for carrying out the program. Thus, in one flood-control program the Federal Government acquires lands for flood-control reservoirs while in a second program lands must be acquired by local interests. There are many other differences of a similar nature that could be cited.

Too many times legislation is enacted immediately after a particular disaster, may it be floods, hurricanes, or drought. Thus emphasis is frequently given to solving that particular problem which, in the total picture of water development for the area, may not be a major one. Naturally, the agency carrying out the program oversells that one phase of the water resource program. For example, in Massachusetts, due to natural topography, available reservoir sites are limited and getting scarcer. However, if there is an opportunity for a grant for the construction of flood-control reservoirs, naturally those reservoirs are built with the available funds. However, in a particular drainage area the major problem may be the lack of water and it would be better to use those reservoir sites for the storage of water for compensating low flows. Again, this points up the need for a complete examination of the water problems of a river valley.

In many cases Congress has enacted legislation for carrying out worthwhile water resource projects which have not been too effective because of administrative handling. This is caused by ever-changing administrative regulations, the formulation of mountainous volumes of regulations, and a tendency toward sterotyped projects which frequently do not fit into the needs of the particular region.

The policy on the use of cost-benefit monetary values should be reexamined where multiple uses are envisioned in Federal projects. Frequently the most desirable secondary use of some of the Federal reservoir areas has been for recreational purposes. It becomes almost impossible to place a monetary value on the enjoyment and benefits that are received from the use of these recreational facilities.

There seems to be a need for reexamination of policies that require a local contribution to obtain data from a Federal agency in a more usable form. For example, in order to obtain an analysis of the streamflow data from the U.S. Geological Survey in a form that would be readily useful to the solution of water problems it is necessary to enter into a 50–50 cooperative agreement with that agency for the preparation of the data. If it is important enough for the Federal agency to have funds appropriated to collect the data, then it is equally important that the results be made available in a useful form.

There is a need for reexamination of the land-taking procedures for Federal water projects. Less hardship would result to persons residing in a proposed reservoir area if their land could be acquired as soon as the project is authorized and funds appropriated to start the project. The taking of land in reservoir sites in fee instead of taking easements in those cases where it is possible to develop other uses of the reservoir area for hunting, fishing, and other recreational purposes should be considered.

No review of a water resource program could be made without mention of the need for research. The lack of basic data and adequate research make it difficult

to develop and administer water resource programs. There are frequently too many preconceived ideas which are not supported by facts. A fresh approach with an interchange of views by the various types of water users is needed before a major project is undertaken.

In those fields where the Federal Government has grant-in-aid programs for flood control, pollution control, fishing, and recreational development, such grants have been most useful and should be continued.

We in Massachusetts feel that the water resources commission, even though it is only in its swaddling clothes, is performing a very useful function in coordinating the water resource programs within the State. This leads us to the conclusion that, if a similar type of agency was established among the Federal agencies to coordinate their activities, not necessarily to take over their individual functions, but to assist the State water resources agencies, it would go a long way toward meeting our water needs under ever-changing economic and social conditions.

The CHAIRMAN. All right, Mr. Sterling, thanks for a very fine statement.

And we will be glad to hear the other witnesses you have for us.

Mr. STERLING. I would like to present Mr. John Burke, who is the commissioner of the department of commerce. The department of commerce here is our planning and development agency in this State.

Mr. John Burke.

The CHAIRMAN. Good morning, Mr. Burke.

STATEMENT OF JOHN T. BURKE, COMMISSIONER, DEPARTMENT OF COMMERCE, COMMONWEALTH OF MASSACHUSETTS

Mr. BURKE. Good morning, sir.

Gentlemen, it is a great pleasure to be here as commissioner of commerce and to outline in some detail the background of our State industry and the prospects for its future expansion, of growth, population and otherwise, and to help us along that line we have a detailed report, as you see there, that will give you most of the details, and which I am sure you will be willing to look at at some time later.

The growth rate of the Massachusetts population for the next 50 years is expected to be somewhat moderate compared to other parts of the country. Nevertheless, we anticipate substantial growth since our natural increase, births over deaths, will continue to grow over this period. By 1960 we expect the population of Massachusetts to be over 5 million. By 1980 our projection shows that the population will be slightly under 6 million and by the year 2,000 we estimate a figure of about 7 million persons resident in this State. These projections are based primarily on a continuation of present trends and it should be noted, particularly on the long-range forecasts, that many factors, anyone of which could influence this growth, would call for a review and modification of our projections.

The labor force of any given area is dependent upon the size and composition of the population. In projecting the labor force over a 50-year period we assume that the labor force participating rates will continue to expand and that the economy will provide job opportunities suitable to the groups entering the labor force.

On the basis of these broad assumptions, we find that by 1960 our labor should increase to about 2,060,000 by 1980 to approximately 2,430,000 and finally by the year 2000 the labor force is expected to be slightly over 2,800,000. These projections, incidentally, gentlemen, have been made by our research division in this department.

Massachusetts, with a mature economy dating back some 300 years, has continued to show industrial growth although less spectacular than that of some of other States. Nevertheless, the State continues to be one of the leading industrial States in the country and has made notable advances in certain fields in recent years. The composition of the economy of Massachusetts has changed from a concentration of nondurable goods to a greater dependence on durable goods. And, as I speak to you this morning, gentlemen, that equation is almost equal. Within the last decade, this change has led to a more diversified and healthy economy with a decided emphasis in fields that promise future growth.

The one industry that has displayed a tremendous growth in the last 10 years is in the field of electronics and nucleonics. Other industries that have witnessed substantial growth and indicate continued growth in the future are chemicals and plastics, machinery and paper and printing. Under the nondurable category, we feel that the textile and apparel industries will become more stable with specialized products and our leather industry will continue to be a prominent leader in our economy. In summation, it may be stated that Massachusetts should continue to grow in both durable and nondurable fields with the greatest growth occurring in durable goods as it adapts its resources to our expanding economy.

The text of this report also contains information on flood-plain zoning and regional planning. Both of the State enabling acts pertaining to these subjects are relatively new in this State. So far, there are five municipalities that have adopted flood-plain regulations, and two regional planning districts established in Massachusetts. However, there is much interest being shown for regional planning in different areas and regional-metropolitan planning should expand considebably in the next several years.

The CHAIRMAN. Thank you very much, Mr. Burke.

Mr. BURKE. Thank you, sir.

The CHAIRMAN. I have been advised that Mr. Mark Abelson, acting Chairman of the Northeast Field Committee of the U.S. Department of the Interior, is with us.

Mr. Abelson, we are glad to see you sir.

All right, Mr. Sterling, Mr. Burke's entire statement will be made a part of the record.

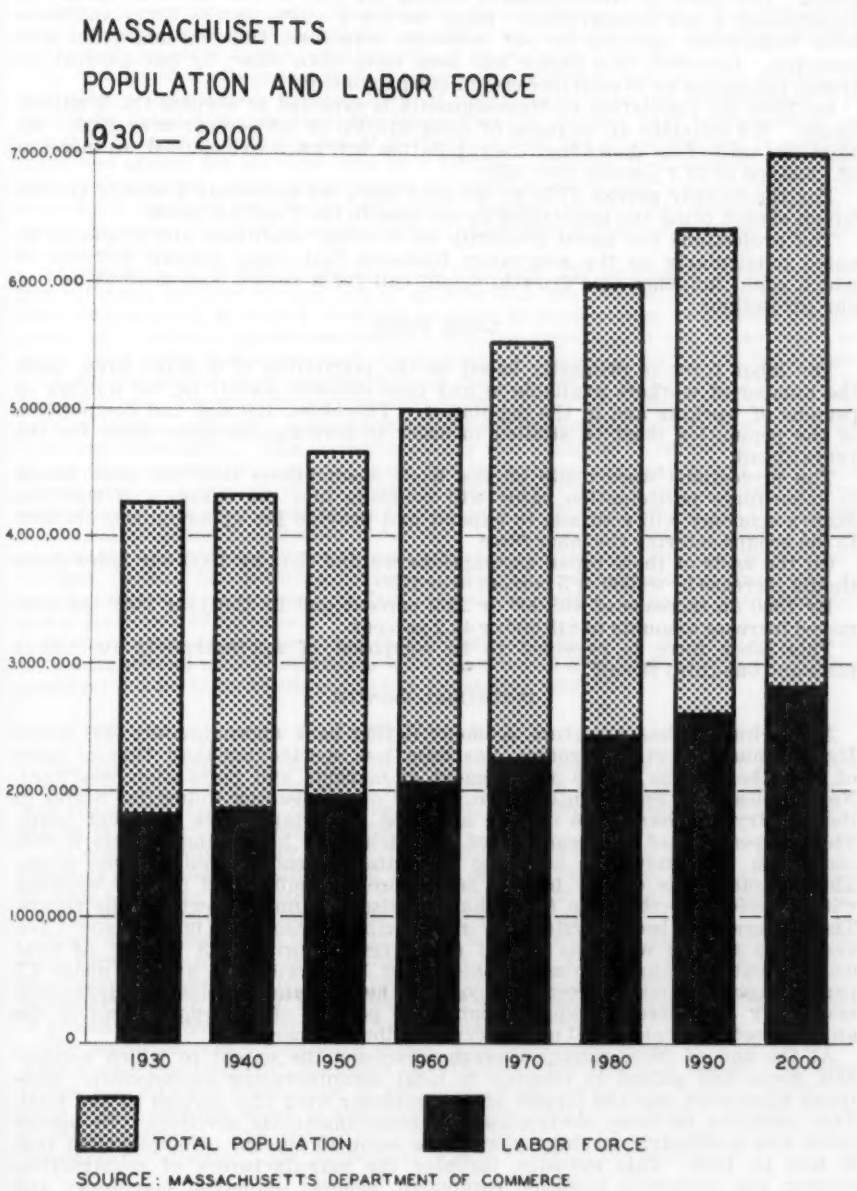
(The statement referred to follows:)

STATEMENT BY JOHN T. BURKE, COMMISSIONER, MASSACHUSETTS DEPARTMENT OF COMMERCE

POPULATION

The growth rate of the Massachusetts population is expected to be moderate compared to other parts of the country. Basically, population projections are made on fertility, mortality, and migration rates. In Massachusetts our fertility rate has been rising steadily while the mortality rate has been on a steady decline. At the present time our natural increase, births over deaths, is approximately 50,000 annually. This figure can be expected to increase moderately in the next 5 years but more sharply in the latter part of the 60–70 decade because of the family formations between those born shortly after World War II. The birth rate should level off with moderate increases during the next two decades and then again increase sharply in the 1990's.

The migration factor, which is important in population projections, is somewhat dependent upon the economic conditions of a given area. The mobility of


MASSACHUSETTS
POPULATION AND LABOR FORCE
1930 — 2000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1930
1940
1950
1960
1970
1980
1990
2000
TOTAL POPULATION
LABOR FORCE
SOURCE: MASSACHUSETTS DEPARTMENT OF COMMERCE

people has become more flexible in recent years and we have witnessed tremendous movements from the highly industrial and congested areas to the suburbs. Young people are constantly moving to less mature and fast-growing areas. The State of Massachusetts, during the past two or three decades, has experienced a net outmigration. Since we are a more mature State and have been undergoing changes in our economic structure, this out-migration was expected. However, this factor has been more than offset by our natural increase indicating an overall increase in our population.

By 1960, the population of Massachusetts is expected to surpass the 5 million figure. We estimate an increase of some 319,000 or 6.8 percent over 1950. By 1980, our projection shows that the population will grow to 5,990,000, an increase of 1,299,000 or 27.7 percent over 1950.

For the 50-year period, 1950 to the year 2000, we anticipate a steady growth which should bring the population figure close to the 7 million mark.

The projections are based primarily on existing conditions and it should be noted particularly on the long-range forecasts that many factors, any one of which could influence this growth, would call for a review and modification of our projections.

LABOR FORCE

The labor force is primarily based on the population of a given area, since the number of workers available at any time depends mainly on the number of persons of working age in the population. Therefore, the size and composition of the population must be studied in order to forecast the labor force for the years ahead.

The projections were made on the basic assumptions that the past trends in labor-force participation rates will continue into the future and that the State's economy will continue to expand and provide job opportunities suitable to the groups entering the labor force.

On the basis of these broad assumptions we find that by 1960 our labor force should increase by 98,000 or 5 percent over 1950.

By 1980 an increase of 468,000 or 23.9 percent and by the year 2000 the estimated increase amounts to 848,000 or 43.2 percent.

This labor force is expected to be composed of approximately two-thirds male and one-third female.

INDUSTRIAL GROWTH

Massachusetts has a mature economy dating back approximately 300 years. Its continued growth, therefore, has been less spectacular than that of some of the other States due to a movement of markets and population westward. Nevertheless, the State continues to be one of the leading industrial States in the country and has made notable advances in certain fields in recent years. The composition of the economy of Massachusetts has changed from a concentration on nondurable goods to a greater dependence on durable goods. This characteristic change has led to a more diversified and healthy economy with a decided emphasis in fields that promise continued growth in the future. The change has been particularly noteworthy during the last decade. Ten years ago textiles were the largest employers comprising 18 percent of total employment in manufacturing, leather about 10 percent, and apparel about 7.7 percent were the next largest employers in the nondurable fields. Nonelectrical machinery accounted for approximately 10 percent of the employment in the durable sector and electrical machinery contributed 8 percent.

At the end of 1958, annual averages disclosed the extent to which nondurable goods had gained in relation to total manufacturing employment. Electrical machinery was the largest single employer with 12.5 percent of the total. This category includes electronics and communications divisions. In second place was nonelectric machinery with the same 10 percent of employment that it had in 1948. This industry includes the manufacturers of construction, mining, and materials handling equipment, general industrial machinery and office, computing, and accounting machines. Leather reported 9 percent of the total and textiles had declined to 7.7 percent of manufacturing positions.

It is probable that if the present trend continues the employment may be equally divided among durable and nondurable goods by the end of the next decade with more impressive growth occurring in the durable-goods field. While it is not possible to predict with accuracy the actual growth of a particular industry, analysis of the economy does provide a reasonable indication of what

may occur if current trends continue. On this basis, it can be said that machinery—nonelectrical—will experience a growth consistent with its position in the economy. This is perhaps a normal growth as opposed to electrical machinery which should continue its impressive growth and continue to command a larger percentage of total manufacturing employment. The other industries in the durable-goods field should decline relatively in importance but still continue to grow in response to the requirements of an expanded market.

In the non-durable-goods field textiles will probably continue to decline in importance determined by its share of total manufacturing employment. It should be noted however, that, for Massachusetts textiles have concentrated on specialization and there are recent indications that the actual decline in employment has abated for the first time in a decade. Textiles then should grow, but only to the degree that it continues to command a specialized market and it will, eventually continue as a major employer. Apparel should also continue to be a major employer because of specialization which has added stability, to a degree, to the industry.

At present half of New England's establishments are located in Massachusetts and although the relative position of apparel will tend to decline with respect to total employment, it should continue to grow if it continues to provide quality products to serve a specialized market, but the growth will not be as rapid as other nondurable industries such as chemicals or paper and printing industries.

Chemicals should grow impressively as the advantages of the area continue to be exploited. The plastics segment has experienced outstanding growth and it is still an infant industry. This growth may not approach that of electronics but it will be substantial. The leather industry will continue to employ a large part of the total manufacturing employers, but indications are that it will decline in importance even though it has continued to rank third in employment for the past decade. Its growth should be consistent with its position but not impressive compared to other nondurable industries. Printing and paper should expand reasonably due to their historical position in their industries and their prominence in their fields. The printing industry has evidenced remarkable resistance to business fluctuations and may be said to be closely allied to the service industries due to its source of revenue.

In summation, it may be stated that Massachusetts should continue to grow in both durable and nondurable fields with the greatest growth occurring in durable goods as it adapts its resources to our expanding economy.

FLOOD PLAIN ZONING

The State enabling legislation permitting cities and towns to insert flood-plain control in their zoning regulation is relatively new in this State. The statute was passed by the State legislature in 1954. The section controlling flood-plain zoning is very brief and reads as follows:

"A zoning ordinance or bylaw may provide that lands deemed subject to seasonal or periodic flooding shall not be used for residence or other purposes in such a manner as to endanger the health or safety of the occupants thereof" (sec. 2, ch. 40A of the General Laws of Massachusetts).

Since enactment, many cities and towns have studied the question of adopting some form of regulations controlling the use of land which is periodically flooded. The records of the division of planning show that thus far there are five municipalities that have adopted such regulations and several others are in the process of presenting them to their respective legislative bodies.

The municipalities which have passed flood-plain zoning are the city of North Adams and the towns of Wayland, Marshfield, Concord, and Dover, the most recent being Dover. The type of regulation adopted by this town is bound to have a far-reaching effect in the future, if the legality is upheld by the courts of Massachusetts. The regulation adopted by the town meeting establishes a "conservancy district," the purpose of which is stated as follows:

"Section V. Conservancy District

" 'C'—Conservancy District is intended for the preservation and maintenance of the ground-water table upon which the inhabitants depend for water supply; to protect the public health and safety, persons and property against the hazards of floodwater inundation; for the protection of the community against the costs which may be incurred when unsuitable development occurs in swamps, marshes, along watercourses, or in areas subject to floods; to preserve and increase the

amenities of the town; and to conserve natural conditions, wildlife, and open spaces for the education, recreation, and general welfare of the public."

The uses allowed in this district are as follows:

In the conservancy district no building or structure shall be erected, constructed, altered, enlarged, or moved, nor shall any premises be used, for any purposes except—

1. Conservation of water, plants, and wildlife;
2. Recreation, including play areas, nature study, golf, boating, and hunting where otherwise legally permitted;
3. Grazing and farming, including truck gardening and harvesting of crops;
4. Forestry;
5. Telephone, telegraph, power, and gas transmission;
6. Any of the following uses, on approval of the board of appeals:

a. Nonresidential buildings and structures, such as—

(1) Barns, stables, or kennels for shelter, breeding, boarding, hiring, or sale of animals, and for storage of crops raised on the premises;

(2) Boathouses, duckwalks, and landings—including renting of boats or canoes and recreation equipment, and sale of bait;

(3) Temporary refreshment stands or stands for sale of produce raised on the premises:

Provided, That any such building or structure permitted by the board of appeals shall be designed, placed, and constructed to offer a minimum obstruction to the flow of water and shall be firmly anchored to prevent floating away and thus threatening other buildings or blocking of openings in restricted sections of the watercourse below.

b. Amusement enterprises such as golf range, pony rides, racetrack, circus, and carnivals, not including any permanent structures and subject to other town bylaws and regulations.

c. Dams, changes in watercourses, or drainage works—only as part of an overall drainage-basin plan constructed or authorized by a public agency.

d. Temporary storage of materials or equipment.

e. If any land shown on the zoning map as being in the conservancy district is proven to the satisfaction of the board of appeals, after reference of the proof to and report by the planning board and board of health, as being in fact not subject to flooding or not unsuitable because of drainage conditions for residential use, and that the use of such land for residence will not interfere with the general purposes for which conservancy districts have geen established, and will not be detrimental to the public health, safety, or welfare, the board of appeals may permit the use of such land for single-family residence under all the provisions of this bylaw applying to the R–2 residence district.

The restrictions enumerated in the section could have far-reaching effect in the future for the conservation of open land and wetlands desirable for wildlife. They may also be very helpful in preventing stream encroachment. However, such control should be on a stream basis and not by municipalities, since a municipality without such restriction may nullify the benefits derived by upstream municipalities having stream-encroachment controls. The final section in the requirements within this so-called conservancy district is as follows:

"Except as provided above, there shall be in the conservancy district—

"No land fill or dumping in any part of the district;

"No drainage other than flood control works by an authorized public agency;

"No damming or relocating of any watercourse except as part of an overall drainage-basin plan;

"No building or structure;

"No permanent storage of materials or equipment.

"If for any reason the restrictions or requirements contained in this article V shall be or become invalid or inoperative as to any land shown on the zoning map as being in the conservancy district, then such land shall thereafter be deemed zoned in R–2 residence district."

In recommending the adoption of such a district, the Dover Planning Board made the following observation to the town meeting:

"The article does not permit land filling, damming, or relocating of water. This portion is very important in that even though it prohibits the altering of

conservancy land to suitable building land, it does guarantee the maintenance of our ground-water table. It is generally accepted that the supply for our wells comes indirectly from marshlands, the loss of which could eventually mean the drying up of our wells and then possible expense of a town water system;"

There is the possibility that this conservancy district regulation may be litigated and possibly reach the Massachusetts Supreme Court for a judgment of the legality of such controls. Until such time as a judicial opinion is rendered on its legality, many municipalities will hesitate to follow along with the town of Dover.

REGIONAL PLANNING

The General Court of Massachuseetts enacted legislation in 1955 that allows any group of municipalities that, in the opinion of the division of planning of the department of commerce constitutes an effective region for planning purposes. to establish a planning district. The purpose of this legislation is to allow cities and towns that have similar physical, social, and economic problems to plan jointly so as to promote, with the greatest efficiency and economy, the future development of the region.

Presently, there are two areas that have formed a regional planning district under this statute. The first such region to be established in Massachusetts is located in the Bristol County area having as its urban core area the cities of Fall River and New Bedword. This region is called the Southeastern Massachusetts Regional Planning District.

The other region is new, having been established in 1959. It is called the Central Merrimack Valley Regional Planning District and has the city of Lawrence as its core center. No studies have been made in this area as yet since funds will not be available until 1960.

There have been five studies made in the Southeastern Massachusetts Regional Planning District described as follows:

1. "Regional resources and problems," an overview survey of southeastern Massachusetts identified problems that must be solved before full and proper utilization can be made of the region's assets. This study considered five primary resource areas: population, natural resources, urban patterns, transportation, and economic resources.

2. "Regional industrial potential" was a study of recent trends in manufacturing industry together with preliminary recommendations for actions to improve and strengthen the region's industrial base.

3. "Population trends," an analysis of changes in the size, characteristics, and distribution of the population of southeastern Massachusetts, with projections for 1970.

4. "Employment and economic trends," an economic base study of the region with projections of the types and amounts of employment that southeastern Massachusetts is likely to provide for its population in the 1959–70 period.

5. Natural resources," an analysis of the area's natural resources, as well as studies of water supplies and recreation facilities.

Two additional major elements in this regional planning program are scheduled for completion in 1960. These are—

1. A survey of transportation in the region including highways, railroads, harbor, and airports.

2. A study of urban resources with attention to such items as community planning and zoning programs, urban renewal, education, and community fiscal structure.

There are some areas in this region that have critical water-supply problems. The study on natural resources covered the water problem extensively and made several recommendations for the future. One, in particular that was stressed is the continuation of the ground-water-potential determination now being carried on by the Massachusetts Water Resources Commission.

There have been many attempts during the past 10 years to establish a Boston Metropolitan Planning District. There is no doubt of the need of such an agency when one considers the vital problems of transportation, population, urban renewal, and many other problems that need immediate attention of such an agency. A bill has again been filed with the Massachusetts Legislature for action during the 1960 session to establish a Boston Metropolitan Planning District.

As to the other metropolitan and regional areas in Massachusetts, there are signs of action toward regional planning. However, establishing a planning district under the present enabling statute is a very slow process, and it may be

years before much benefit is derived from regional and metropolitan planning in Massachusetts.

Mr. STERLING. I would like to introduce the next commissioner, who is Mr. Charles Foster, commissioner of the Department of Natural Resources. If Senator Moss has not already met him he will probably be with you at your hearings for the next 2 days down on the cape.

Mr. Foster is also chairman of the water resource commission, I should say, and my boss.

STATEMENT OF CHARLES FOSTER, COMMISSIONER, DEPARTMENT OF NATURAL RESOURCES, COMMONWEALTH OF MASSACHUSETTS

Mr. FOSTER. Thank you very much, Mr. Sterling and members of the committee.

I have made, I hope, satisfactory arrangements for Senator Moss a little later on this afternoon. We very much look forward to having him with us an additional 2 days.

I am Charles Foster, commissioner of the Massachusetts Department of Natural Resources, an agency charged by law with the care and oversight of the State's natural resources. Included in this definition are the lakes, ponds, streams, coastal, underground, and surface waters of the Commonwealth.

I am also, by virtue of office, the chairman of the Massachusetts Water Resources Commission whose director and chief engineer, Mr. Clarence I. Sterling, Jr., has already addressed your committee.

I would like to briefly discuss with the committee three recommendations for improving Federal water resource programs as they pertain to the field of natural resources.

First, is reference to the need for an accelerated program of watershed research. Here in the Commonwealth we are more heavily forested by the portion of total land area in woodland than some of the western timber-producing States. Despite our small size and high population density almost 70 percent of our State, and consequently its watershed area, is covered by tree growth.

As the custodian of nearly 175,000 acres of State forest land the department of natural resources has an obvious stake in sound watershed management. It is the representative of the Federal Government designated by the U.S. Forest Service to assist forest-management activities encouraged through such agricultural efforts as the soil bank, agricultural conservation program, and the extension program.

The department furthermore maintains almost total control of private lumbering operations throughout the State under the Forest Cutting Practices Act which requires all commercial operations of major size to be cleared, first, through the department of natural resources.

In a State and a region where wood and water are its two prime natural resources, it is appalling how little we currently know of their basic relationships.

Although sound forest management is generally believed to have a profound effect on water, the degree to which such practices produce quantity or quality of supply or reduce damages in times of flood is the subject poorly understood by most people.

For a region faced with steadily increasing water needs and a dwindling resource base, the provision of definitive information along such lines would seem of critical importance.

My first recommendation would therefore be that the Federal Government carefully review, coordinate, and then accelerate its programs of resarch on the fundamental relationships of soil, forests, and water, and that such studies be undertaken through the mechanism of existing outlets for research within the States.

The second relationship I would like to discuss lies in the rapidly expanding field of public outdoor recreation, an industry now worth an estimated $300 million annually in Massachusetts alone.

Without water for boating, bathing, fishing, or even scenic use, this multi-million-dollar vacation business would be virtually nonexistent. The pressures on unspoiled land and water throughout the northeast are almost unbelievable.

The CHAIRMAN. Repeat that.

Mr. FOSTER. Are almost unbelievable.

The CHAIRMAN. I say repeat the sentence.

Mr. FOSTER. The pressures on unspoiled land and water throughout the Northeast are almost unbelievable. This is particularly true of our State, Senator.

In 1957, a firm of engineering consultants of our Department recommended some 157 projects to the department of natural resources, almost all involving water areas of the foundation of an expanded State parks program.

A scant 2 years later nearly 70 percent of these sites were no longer available.

On the credit side, Massachusetts views with promise the recreation possibilities at Federal flood control reservoirs either now completed or due to be constructed within the next few years. A substantial acreage of permanent water surface can thus become available to a public badly in need of such recreation opportunity. Despite the interests and efforts of many agencies, current policies now seriously hamper sensible multiple use of these reservoir tracts.

For example, the bulk of the land to be flooded is acquired by easement only despite the insignificant difference in cost of obtaining it in fee. Federal procedures now make it virtually impossible for the States to work with the construction agency in this regard even when local funds are available for additional acquisition or development.

I dare to prophesy that the day is fast approaching when impoundments can be economically justified from their pleasure use alone.

Of all the major values of water, recreation seems to be the only one which currently receives little or no concerted attention at the Federal level.

My final recommendation is perhaps the most fundamental one of all. It involves the frightening lack of public perception and action in advance of actual prices by flood or drought. We are particularly conscious of this phenomena in Massachusetts. Despite regularly recurring instances of flood and drought our public continues to occupy active flood plains and to defer water supply improvements to another year. There is, of course, no way to legislate a program that is essentially educational.

Groups, such as Leagues of Women Voters, can do and are doing much to improve knowledge of water needs at the local level. The Federal Government with the informational and educational resources at its disposal could play an important role in such an undertaking.

I would suggest for your consideration the enlargement of cooperatives water resource units at key State universities with joint Federal-State financial support.

Such units would serve not just as centers for research work in a broad variety of water resource problems but also as valuable educational media in a field long plagued by specialization.

In closing, I would like to thank the committee for the privilege of testifying and wish to assure its members of the continued interest and cooperation of the Massachusetts Department of Natural Resources, in all present and future water resource programs.

Thank you very much.

The CHAIRMAN. We want to thank you for testifying, Mr. Foster, on what this country needs. And one of them is men of your attractive personality and excellent concept of a problem and ability to be articulate about it.

I would hope that your tribe would increase and all be dedicated to the same objective you have.

Mr. FOSTER. Thank you very much, sir.

The CHAIRMAN. You were talking about not acting until the pressure was on. I remember a family of pioneers who lived very close to the farm I was born on and that old boy had that same tendency. He had a very bad roof that leaked terribly when it rained. And my father was talking to him one day about fixing it.

He said, "Well, Sam, when it doesn't rain I don't need it fixed and when it does rain I can't get to it."

Mr. FOSTER. Very appropriate, Senator. Thank you.

The CHAIRMAN. You covered a subject that we are tremendously interested in and that is the economic value of recreation. We have legislation pending now to direct the various Federal agencies in making economic surveys and evaluations of proposed projects to give effect to the recreational value.

Have you given that amount of thought to that subject that would cause you to feel justified to either give us the statement on it or come down and testify on it?

Mr. FOSTER. I will be very happy to do so. In deference to your committee I think I should be very well prepared to give you this definitive information.

The CHAIRMAN. Let me say this to you——

Mr. FOSTER. I would be more than happy to do so.

The CHAIRMAN. You need not feel the least bit timid about that because we acknowledge our need of information, going on the theory that the best way in the world to get rid of ignorance is to expose it. We would feel that with the experience and opportunity you have to make observations in that field of knowledge that you will be able to make a contribution to our committee and its deliberations on that subject.

Mr. FOSTER. I will be very happy to do so, Senator.

The CHAIRMAN. Fine, sir.

Mr. Mutz, I would like for you to fix it so that when we have hearings on that bill Mr. Foster is invited to come down and testify.

All right, Mr. Sterling.

Mr. STERLING. On this same general subject, Senator, I would like to ask Mr. Charles McLaughlin, director, division of fisheries and game, to present his views on the same subject.

STATEMENT OF CHARLES L. McLAUGHLIN, DIRECTOR, DIVISION OF FISHERIES AND GAME, DEPARTMENT OF NATURAL RESOURCES

Mr. McLAUGHLIN. Good morning.

The Massachusetts Division of Fisheries and Game welcomes this opportunity to speak with you gentlemen in regard to the subject of water resources.

As the State agency primarily responsible for management of Massachusetts fish and wildlife resources, we are entrusted with a historic and valuable resource. Over 300,000 persons hold licenses to hunt and fish in this State, and these same persons spend annually in excess of $74 million in the pursuit of this type of recreation. Not only are there 300,000 people who are licensed, but there are many hundreds of thousands of people who participate in feeling the benefit and the joys of seeing wildlife resources and fish resources.

Fish and wildlife, however, are just like an agricultural crop, as I am sure you are aware. It is a product of the land and water, and whatever man may do to create regarding land or water or affecting it affects fish and wildlife. The fish and wildlife resource is, in fact, an end result, benefactor, or victim of man's manipulation of water where it falls on the land or runs in lakes and streams.

As such, we are primarily and very definitely concerned with water and any agency or act of man which affects water. In this connection I would like to make one or two recommendations in regard to what we might call problems in dealing with Federal agencies on water problems.

Most particularly, in reference to what the Commissioner mentioned in regard to a small State heavily populated which needs as much possible room for recreational resources and uses that can be devised, statewide or federalwide.

In this connection, and concerned with Federal flood control, the Corps of Army Engineers and the Soil Conservation Service both have certain activities within this Commonwealth.

Drawing from the experience which we have had in dealing with these agencies and in cooperating with them in trying to foster a fish and wildlife benefit as well as a flood-control benefit we find that there was one particular policy of the Corps of Engineers which bothers us in attaining the ends we believe of not only flood control but also of providing with flood control, fish and wildlife resources.

Several years ago the Corps of Engineers had a policy which allowed them to acquire in fee most of the land behind a flood-control dam which would be flooded.

Over the last 2 or 3 years there apparently has been an Executive Order prohibiting the corps from acquiring land in fee except that which is needed for the construction and operation of the project itself. All other land subject to inundation is acquired normally by easement.

This does not provide the fish and wildlife resource land which can be considered to be a part of the project. These easements do not

cover the hunting and fishing rights. They only cover rights to flow. As a result it makes it very difficult for this division to actively engage in providing within these areas fish and wildlife benefits which we believe would have an immediate and widespread effect on the people in this Commonwealth.

In addition, erection of these flood-control dams in most cases provides no room for a type of pool which could be retained and used during periods of low rainfall to bolster the flow in the streams and rivers below.

I think Mr. Sterling pointed out that we have an abundant rainfall but also many times of the year we have a lack of rainfall. Some years this becomes a critical thing in terms of the fish source in the streams below these dams. In most cases it would not require a large amount of water to be held but only enough to create a very minimum flow.

Our streams have through our own activities or activities of the State been neglected in the past. Many have been dredged. Our forest resources have been cut in the wrong places, and these streams no longer provide the minimum flow necessary to maintain a good fish or wildlife resource during periods of low water.

We strongly recommend that the Corps of Engineers be authorized to take by fee land needed for recreational facilities within these flood control dams. In recreational facilities I mean recreation considering fishing and hunting as a form of recreation.

Unfortunately there seems to be interpretation of what is and what is not recreation. Picnic tables, et cetera, have ended up as being recreation. Hunting and fishing is not considered to be recreation. It is a sport and certainly is a recreational sport, but it is very hard to find Federal agencies who are not particularly concerned with fish and wildlife problems considering it as a part of the recreational benefits.

We feel that there is one other place where perhaps a change in Federal policy might be desirable. In the flood control activities of the Corps of Engineers the Federal Government pays the entire cost. In the flood control activities of the Soil Conservation Service only portions of the costs are paid. Some must be paid by local interests.

I fail to understand how one type of flood control is entirely federally financed, another type of flood control which apparently has the same objective, that of controlling floods, is put on a different basis. It may very well be good reason for that but it would certainly aid us in our operations with the two agencies if we had the same footing in both cases instead of an entirely different setup.

The CHAIRMAN. Do you have the operation of the Small Watershed Act in your State resulting in projects coming up for approval?

Mr. MCLAUGHLIN. That is right. That is what I have reference to, sir.

The CHAIRMAN. Now, is your thesis that the provisions in that act with reference to acquisition in connection with the flood control features of these projects should be made the same as those in general flood control or vice versa?

Mr. MCLAUGHLIN. I believe the first, yes; that the acquisition of flood control sites under Public Law 566 should be made on the same basis as that where the Corps of Engineers runs flood control projects.

The CHAIRMAN. When that matter was before our committee, to be

written in the form it now has, that was a very live subject of discussion, and actually the soil conservation representatives from the local districts themselves brought to us the recommendations for the provisions that are in the bill. I would believe that there are few if any examples of legislation which are in a form more nearly agreeable to the recommendations of those who came seeking it than in that act, and if the soil conservation organizations, local supervisors and directors themselves, were to ask for the change that you are talking about, I would say to you that it would be looked upon with favor.

Mr. McLAUGHLIN. I have no knowledge whether they will or will not.

The CHAIRMAN. Yes.

Mr. McLAUGHLIN. I am only speaking from my own observation of the act and how it works.

The CHAIRMAN. You can understand how their attitude would be of considerable effect.

Mr. McLAUGHLIN. Yes, I do. They are primarily concerned with it.

The CHAIRMAN. Now, of course, with reference to local floodways, especially in municipalities that are constructed by the Corps of Engineers, considerable local participation is required. Now, the general principle has been in legislation for flood control and multiple-purpose projects, to not have a requirement for local participation. There has been a very strong effort on the part of this national administration to get that into the law. Some very fine people are supporting it. I am not one of them, because I think that the objective is of such transcendent importance and of such great value to the general public that to follow their recommendations would be like making all Federal highways caldrons. But nevertheless there is considerable support for that project.

I am not listed as one who supports it.

Mr. McLAUGHLIN. Thank you very much.

Mr. STERLING. I might say one thing, Senator, on Public Law 566. We had a very active soil-conservation group working in this State and today, however, we have not had one single project that has gone forward.

The CHAIRMAN. Have you sent any up from your State office?

Mr. STERLING. What is that?

The CHAIRMAN. Has your State soil-conservation agency, whatever it may be, approved any and sent them to Washington?

Mr. STERLING. Yes; they have been approved and they have been sent to Washington.

The approving agency in this State is the water resources commission. One factor involved seems to be that in our watersheds here when we are talking about a basin we are talking about a lot of property owners. When we get back to local contribution it becomes very difficult. We are not talking in areas where you have relatively few landowners. Here you may get on to a drainage area where you have 300 or 400 different owners.

It is very difficult to get acquisition from those owners as to soil-conservation practices and also to get the rights to floodlands and so forth. Basically, the law and the intent behind the law is good. It seems that we will have to have some other kind of rules to get our projects in operation.

The CHAIRMAN. We would be very glad to have you come forward with recommendations and submit them to our committee.

Mr. STERLING. Thank you very much.

The CHAIRMAN. Yes, sir.

(The prepared statement is as follows:)

STATEMENT BY THE MASSACHUSETTS DIVISION OF FISHERIES AND GAME

Mr. Chairman, honorable Senators, the Massachusetts Division of Fisheries and Game welcomes this opportunity to provide testimony on the subject of "Water Resources," a subject of prime importance to the public today.

As the State agency responsible for management of Massachusetts' fish and wildlife resources, we are entrusted with a historic and valuable recreational resource. Over 300,000 persons hold licenses to hunt, fish, or trap in this State and these same persons spend annually over $74 million in the pursuit of this type of recreation. It is clear then that our interest cannot be restricted to the wildlife resource alone, but must consider equally those persons who pursue an active, recreational sport supported by the fish and wildlife resource; plus the uncounted, unlicensed, thousands of persons who derive plain pleasure from wildlife populations.

Fish and wildlife, like agricultural crops, are products of the land and water, and whatever man may do or create affecting land or water, affects fish and wildlife. The fish and wildlife resource is in fact an end result, benefactor or victim, of man's manipulation of water where it falls on the land or runs in lakes and streams.

Much national attention has been given to recent efforts to formulate a uniform water-use law. In this realm, this division fully subscribes to the resolution adopted in 1957 by the International Association of Game, Fish, and Conservation Commissioners which follows:

"1. That whenever State or provincial laws governing water use control are enacted, the recreational use of water shall be declared and recognized as a primary beneficial use.

"2. That in any such laws there shall be written certain safeguards including but not limited to the following:

"a. Allocations of water for consumptive use may only be made on the basis of accurate and up-to-date inventories of water quantities and flows.

"b. Where recreational factors exist or may be foreseen, allocations of water may be made only on the basis of minimum flows rather than maximum or average flows.

"c. Relatively clean upstream flows may not be diverted to an extent that will result in the aggravation of pollution in areas downstream from a water-diversion point.

"d. Waters of a stream may not be diverted to a point where an adequate recreational population of aquatic life cannot survive, or so greatly that other important recreational factors are put in jeopardy.

"e. Similarly, waters of a natural lake may not be withdrawn to an undesirable point.

"f. Where endangering upstream diversions may be of such great importance to the economy as not to be denied, then "compensation in kind" shall be provided, by the impoundment by the diverters of floodflows that must be gradually released during periods of water deficiency in natural channels downstream."

This division has been actively cooperating with the two Federal agencies which conduct the bulk of the flood control work in Massachusetts and therefore are foremost among those who control our water resource. They are the Army Corps of Engineers and the U.S. Soil Conservation Service operating under Public Law 566. Drawing from experience with these agencies, we would like to further several specific recommendations:

1. Present Federal agency construction policy of flood control sites is not consistent with regard to cost sharing. The Corps of Engineers meets financial costs 100 percent in flood control matters, while the Soil Conservation Service projects require cost sharing, and the burden of land acquisition is on the local interests. We submit that there is no basis for this difference, and suggest that legislation be enacted to allow each Federal agency to assume 100 percent of the flood control costs.

2. Previous to present policy the Corps of Engineers obtained in fee all the land subject to inundation behind a flood control reservoir. Under this policy

our division has been able to secure license to operate and manage, under conservation practices, public hunting and fishing grounds behind several reservoir sites. In this manner the public received immediate annual benefit in return for public funds spent and the hunting and fishing public, as well as others who use the areas for hiking, horseback riding, swimming, and the like, received direct benefits.

Currently the corps asserts that it is prevented by Executive order from acquiring any land in fee except that which is needed for the construction and operation of the project. All other land subject to inundation is acquired by easement. Though the Flood Control Acts of 1944, 1946, and subsequent acts provide that the public shall be provided adequate recreational opportunities on flood control sites, the corps does not extend this to include land acquisition, in fee rather than in easement, for hunting or fishing. Such a decision, on sites where the opportunity exists, eliminates a form of recreation enjoyed in this State since Colonial days. We therefore recommend that steps be taken for return to the previous corps policy of land acquisition in fee rather than easement. It is our estimate that acquisition in fee will, in general, not significantly exceed the costs of acquiring flowage easements.

3. In line with our own experience and part 2 of the previously cited resolution of the International Association of Game, Fish, and Conservation Commissioners, we wish to call attention to the importance of regulated flows in the natural channels below flood control reservoirs. Though we are blessed here in New England with abundant rainfall, surface and ground waters, man's activities over three centuries have resulted in misuse of this natural heritage to the point where a number of our streams are nearly completely dry in the fall and full to flood levels in the spring.

Erection of flood control dams on these streams provide an opportunity to regulate these flows so that they may approach a more natural condition wherein fish and aquatic life may be maintained on a perennial basis. It is our recommendation that flood control reservoirs be utilized, as part of the federally financed program, to maintain minimum low flows calculated over a reasonable length of time. For example, present minimum flows on a stream may be near zero, whereas a more reasonable low flow to be maintained would probably be that experienced during the lowest 7- or 15-day period out of an average year. Such flows would not only tend to restore our streams to more natural conditions, but would be a benefit to commercial, recreational, and esthetic interests in downstream communities.

From a fish and wildlife standpoint, flood control, a large chapter in Massachusetts water resources, has an opportunity to provide more land whereon conservation practices can be conducted, and wildlife can be managed as a recreational resource for public benefit. Flood control reservoirs can also play an important part in repairing the damage man has done to the natural waterways of this State. As pointed out before, here exists an opportunity for both man and the fish and wildlife resource to benefit. Under present policies and programs these opportunities are not being fully realized. We believe that the recommendations we have put forward will be a significant step in that direction.

Mr. STERLING. I have just two other statements and my witnesses are tied up with their own hearings. They are having hearings. One is for the Department of Agriculture, from Mr. Charles McNamara, and I have a statement here which I will submit to the committee.

There is just one thing he is bringing out and that is the fact, as I mentioned, increased need of irrigation water in the future. He feels that in some of those agriculture programs there is a need to provide storage reservoirs to provide the irrigation water. Whether that could be incorporated in the Public Law 566 or not I do not know.

The CHAIRMAN. There is provision in it for that, you know, and by which the Federal Government will lend to local conservancy or irrigation district, the amount of money they need for that feature in the structure.

Mr. STERLING. The trouble is our local agencies are conservation districts and so forth—soil-conservation districts are not very strong organizations in themselves because agriculture is not a big problem in

the State. Still the ones that are using water are creating problems insofar as our riparian use of water is concerned which is making a difficult problem. We have quite a case now on an individual stream where millowners are suing a town taking water supply out, due primarily to drought. The farmers went in and took water for irrigation purposes and depleted the entire use of the stream. So there has to be some provision for storage of irrigation water for this low streamflow as well as for fishing and recreation.

I will submit that statement to you.

The CHAIRMAN. Fine. It will be made a part of the record.

(The statement referred to follows:)

STATEMENT OF CHARLES H. MCNAMARA, COMMISSIONER OF AGRICULTURE

Previous to 1957 there was a negligible amount of irrigating being done on our vegetable farms. During the summer months and during the drought of 1957, there were many farm ponds developed and irrigating systems installed to help our farmers to get through the season with reasonable crop production. These irrigation installations were put in to draw water from the various rivers running adjacent to the various farms.

In 1957, 26,530 acres were irrigated. This figure includes 5,000 acres of cranberry bogs (this, of course, is flood irrigation) and has been used from the beginning of the bog installations. In 1957, the water reserves, for this type of irrigation, were threatened so that we felt that plans should be made to have reservoirs installed in strategic locations to take care of any future drought period.

Since 1947, there has been an increase each 5-year period of about 5 percent per year of acreage going under irrigation and with this in mind we estimate that by 1980 there would be approximately 53,000 to 55,000 acres under irrigation in the State of Massachusetts. We realize that urbanization is taking place rapidly which means that the farming acreage left will be farmed more intensively and therefore require more irrigation. At the rate of four or five irrigating periods per year for our growing period, amounting to 6 or 8 inches per acre, we would estimate 15 to 18 billion gallons of water should be available for this program.

In carrying out the Suasco watershed view moe specifically as to irrigation in this area which covers the area in the Sudbury, Assabet, and Concord Rivers, we find that in 1956–57, in Essex County, there were 1,500 acres irrigated on 100 farm units according to the Bureau of Census of 1954 and in Middlesex County there were 190 farms reporting and 3,125 acres were irrigated. The sources of water for irrigating these farms were from ponds developed by the Soil Conservation Service. A very small percentage was from natural ponds. The Assabet, Concord, and Sudbury Rivers were sources of a large percentage of the water used for irrigating purposes. It is estimated that for the next year or two there will average two or three systems installed for irrigating 50 acres. In 1975–80 it is estimated there will be approximately 125 additional units for irrigation in the Suasco area and probably an additional 2,500 acres more will be irrigated in this watershed.

One of the reasons for this particular increase will be the development of golf courses in Worcester County. It is estimated that about 750 acres in the next 5 years will be developed for this purpose and by 1980 this figure is estimated to be 1,200 to 1,500 acres given over to this type of recreation, and the new installations are being piped for irrigating purposes during the process of construction.

At the present time the vegetable grower is the most outstanding user of irrigation and this use will undoubtedly be on the increase. The installations will be developed from farm ponds or will be developed from areas abutting any one of the Sudbury, Assabet, and Concord Rivers or their tributaries.

Fruitgrowers are rapidly becoming more interested in irrigation and because of the location of fruit farms these installations will be in conjunction with farm ponds installed by the Soil Conservation technicians on the fruit farms.

In the Suasco watershed area it is the feeling of the Department of Agriculture that sincere consideration should be given to the possibility of developing reser-

voirs to store supplies of water to be used to hold the level of steady flow in the rivers used by the various farmers during the periods of irrigation.

These figures and estimates have been taken from the Bureau of Census of 1954, the Soil Conservation Service technicians' experiences for the past 10 years, and from the soil- and water-conservation needs inventory that is being developed at the present time.

Mr. STERLING. I have one other statement here from the Department of Public Health. Mr. Taylor is here so I will not present his statement.

The CHAIRMAN. Mr. Maloney is not here. And has no statement.

Mr. STERLING. Mr. Taylor has one statement from the department of public health which is the pollution-control agency.

Mr. TAYLOR. All right, Mr. Chairman.

STATEMENT OF WORTHEN TAYLOR, DIRECTOR, DIVISION OF SANITARY ENGINEERING, MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Mr. TAYLOR. Mr. Chairman and members of the Senate select committee, I have a prepared statement that has been authorized by the department of public health at its meeting which is being held at the present time. I do not intend to read it, but I am leaving it with you.

One of the major problems in Massachusetts in regard to its water resources pertains to public water supply. Originally, because of our streams being very short, it was possible to derive a source of public water supply from the upland regions and to discharge waste into the streams below the sources of use, and thus we were able to have abundant supply of water for domestic purposes without worrying about pollution. Thus, our program of pollution control in Massachusetts has been somewhat delayed because of this fact that we were not worried in any particular way about the water supply.

At the present time we find our water resources are becoming so limited that it is necessary to turn to our polluted streams in order to obtain an abundant and adequate source of supply for domestic and industrial purposes.

We believe that it is most economical to provide sewage and industrial waste treatment plants in order to conserve the water resources, and thus one of our problems at the present time is to provide these sewage and industrial waste treatment plants.

We believe that Public Law 660 of Federal law has been most beneficial to the department in advancing the program of both sewage and industrial-waste treatment facilities.

The number of plants that have been installed since the enactment of this legislation has been rather great. We feel that the benefits that are being derived from both programs, that is, one, the program grants in which there is money made available to the State water pollution control agency, which in this case is the department of public health, and the grants-in-aid to communities for the construction of sewage-disposal facilities have been very beneficial. And we would only point out in regard to the program grants that the authorization for such funds expires shortly and it will be necessary to continue that authorization or to make a new authorization, I should imagine this year.

The CHAIRMAN. Let me ask you a question.

Have the communities of the Commonwealth submitted enough programs that have been accepted to use all of the Federal money allocated in Massachusetts?

Mr. TAYLOR. May I expand that slightly to say that during the first 2 years Massachusetts did not use all of the money that was available as grants-in-aid. However, the authorization for use of those moneys was continued to subsequent years, and Massachusetts has now used all of the money that it has available and is strongly looking for more.

The CHAIRMAN. Is there evidence that if the authorization were changed so as to make the individual grant larger to provide that a number of closely located municipalities to built joint sewage-treatment projects, each one of them receiving a grant, and if the overall amount were increased so that the allocation for your State would be greater, is it your judgment that there would be sufficient local interest and participation to take all of the amounts that would be made available on that type of basis.

Mr. TAYLOR. Yes, sir. We believe that if authorization is given and/or if appropriations are made to double or expand the program into—somewhat into—that area of $100 million whether it be $80 million or $100 million, that it would be of very material benefit to the Commonwealth of Massachusetts.

The CHAIRMAN. My judgment is that the Congress will pass such an act early next year. My hope is there will be enough popular support of it that it will either be accepted at the White House or that the Congress will be able to enact it in spite of adverse action.

Mr. TAYLOR. We feel that the program's grants provision and the so-called Blatnik amendment or some version of that, which increases the grants-in-aid provision, are very essential to this program in Massachusetts. In connection with the grants-in-aid provision we would like to see the wording being such that it gave maximum latitude to the use of these funds among small and large communities so that they would have the maximum amount of discretion in the use of those funds and thus the Senate amendment—

The CHAIRMAN. The specifications of availability will be broadened in the act next year.

Mr. TAYLOR. That is right.

The CHAIRMAN. And that is one of the features of the bill, that the committee handling it in the Senate is especially interested in.

Mr. TAYLOR. That would be of very great benefit to us, I am sure, Senator.

The next point that I would like to make is that I think the amount of technical research that is being conducted in the field of water-pollution control is not adequate to meet our needs.

We have many major problems at the present time that have not been solved technically, so that we have an economical method of treatment of both sewage and industrial wastes, and the preparation of water for final treatment for domestic use. I think that funds for technical research should be expanded and a good portion of this may properly be done at the sanitary engineering center at Cincinnati, but also there are a large number of very well operated research facilities not only in the Federal Government but also in State and

private institutions that are very capable of carrying on this research program.

I feel that the Public Health Service should be instructed to carry on a greater program of coordinating the research that is going on throughout the United States and better to keep us advised at State level of the research that others are conducting in order that we may not duplicate unneedingly.

I realize that there is great advantage in having two or three research organizations doing the same kind of work to check each other and to see that the research that is conducted is applicable in various portions of the United States. But still there is a greater need, I believe, for coordinating the activities among the research agencies.

I would also like to suggest, and this may be slightly out of your field, and that is that the Internal Revenue Code would be somewhat modified in order to permit rapid amortization of the cost of sewage and industrial waste treatment facilities that are provided for industry.

I realize that this is a very difficult matter to handle because there are other non-revenue-producing activities of industry that may demand or desire the same sort of consideration such as hospitalization and health programs and such. But it would facilitate the program of water-pollution control very materially. That is the Internal Revenue Code could be changed in order to permit the more rapid amortization of the cost of construction.

The CHAIRMAN. It just happens that one of the committees of which I am a member, the Finance Committee, which handles legislation in the Senate, and I will say this to you, that it will at least be given consideration by that committee.

Mr. TAYLOR. Thank you.

The CHAIRMAN. Thank you very much, Mr. Taylor.

(The prepared statement follows:)

STATEMENT OF THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Mr. Chairman and members of the Senate Select Committee on National Water Resources, I am Worthen H. Taylor, director of the Division of Sanitary Engineering of the Massachusetts Department of Public Health. I have been authorized by the Department to make this statement.

The Commonwealth of Massachusetts is vitally interested at this time in its water resources. The early economy of the State was based largely on a bountiful supply of water for industrial use and for power. The so-called wet industries, largely textile, were located directly along many of our streams in order to take advantage of the abundant supply of clear, soft water, the direct transmission of power, and a readily available method of disposal of wastes. Because of the large number of watershed areas, it was possible to set aside and protect upland areas for water-supply purposes and yet discharge sewage and industrial wastes to streams without endangering the quality of water used for domestic purposes. The increases in population and industrial activity require more and more water. It is no longer possible to supply our water needs from unpolluted sources and we are now turning to our rivers as sources of water supply. In order to conserve this natural resource it has become increasingly necessary to provide adequate sewage and industrial waste treatment facilities. In addition, the use of our water resources for recreational purposes has increased the public awareness of the value of clean waters.

The department of public health is designated by law as the water-pollution-control agency of the Commonwealth. It is charged with the supervision of our inland and coastal waters and administers to an almost complete extent the water-pollution-control program of the Commonwealth, including the State

activity under the provisions of the Federal Water Pollution Control Act, Public Law 660.

This act has provided a strong impetus for the construction of sewage-disposal facilities and has been a major factor in developing increased pollution-control activities essential to the entire water resources program. The authorization for program grants to State and interstate agencies under the provisions of Public Law 660 expires June 30, 1961. Unless program grants are further authorized by Congress, this important activity will be materially curtailed. The rate of public expenditure for the construction of sewage-treatment facilities has been raised to such level in the Comomnwealth of Massachusetts that there is need for expanding the authorization for construction grants under Public Law 660 in line with the so-called Blatnik bill, H.R. 3610. In this connection the wording of the act should be such as to provide the greatest flexibility possible to the States in the administration of the program.

The chemical and plastic industries are producing wastes which are not readily amenable to presently known methods of treatment. Moreover, there are, at present, no economically feasible methods of treatment of wastes which contain large amounts of synthetic detergents. There must be a material increase in research programs for the treatment of sewage and industrial wastes and for water treatment. Financial support of technical research by the Public Health Service and by other qualified research agencies is essential.

Industries requiring waste-treatment plants are not eligible for Federal grants for construction of sewage or industrial waste treatment facilities. Such facilities are non-revenue-producing, and the Department of Public Health, therefore, is of the opinion that the Internal Revenue Code should be revised in order to permit rapid amortization of the cost of sewage and industrial waste treatment facilities to provide further impetus to the program of pollution abatement.

Specifically, the Department of Public Health urges the Senate Select Committee on National Water Resources to consider carefully the need of—

(1) continuation of authorization and appropriations for program grants under the provisions of Public Law 660,

(2) increased appropriation of funds available for construction of sewage treatment facilities under Public Law 660,

(3) increased support of technical research to meet the newer problems of sewage and industrial waste treatment and water supply,

(4) revision of the Internal Revenue Code to permit rapid amortization of the cost of construction of sewage and industrial waste treatment facilities of industry.

Mr. STERLING. Senator Kerr, I just have one thing I want to say in conjunction with what Mr. Taylor said for your information. It was not brought out here.

Massachusetts has been maintaining an experimental station on sanitary engineering since 1886, and the State spends about $325,000 and $350,000 a year on research without Federal Government aid. That is what the State is paying.

In regard to the pollution program, we receive in this State somewhere around $1,200,000 for Federal grants.

The CHAIRMAN. That is the sewage total?

Mr. STERLING. That is right.

And the Boston metropolitan area alone is involved in the program which is costing a little over $100 million at the present time, and that is without any material Federal aid.

I would like to say, Senator, that we could talk to you all day of problems of Massachusetts but we do not want to take the time of our sister States and organizations.

I wish to thank you. If we can supply any information or answer further questions, we will be happy to do so.

The CHAIRMAN. Thank you very much, Mr. Sterling, for an excellent presentation of information and material and data which will be very helpful to our committee.

Mr. William S. Wise of Connecticut, appearing for the New England Governors' conference.

STATEMENT OF WILLIAM S. WISE, DIRECTOR, CONNECTICUT STATE WATER RESOURCES COMMISSION FOR NEW ENGLAND GOVERNORS

Mr. WISE. Mr. Chairman, as you expressed your appreciation of the very warm hospitality received in Boston I was sorry that conditions would not permit you to visit more of the New England States because I think our Governor and our Senators and our Congressmen could show you that all of the New England States extend a very warm hospitality and we regret they did not have the opportunity to demonstrate it.

The CHAIRMAN. Well, that is very kind of you, Mr. Wise. I would urge you to refrain from having an invitation extended by your Senators for our committee to come to Connecticut lest you find yourself in the position of having us descend upon you.

Mr. WISE. I am sure it would be a great pleasure.

I have been asked to present a statement on behalf of the New England Governors regarding the problem of water resources.

The individual New England States and many of the State agencies will present more detailed information at this hearing covering varying phases of water resource conservation and development. Consequently, this presentation will cover only general statements and conclusions for the region.

The opening sentence of the "findings" of the Northeastern water and related land resources compact states:

> The Northeastern part of the United States is by virtue of geographic location and other characteristics a great natural resource area which, with more intense use of natural resources, increasingly requires coordinated planning as a basic ingredient of effective resource management and orderly growth of the region.

The Governors of the New England States heartily concur in this statement and unanimously support any sound and equitable program which promotes the growth, prosperity, and welfare of this great region. What benefits this region also benefits the Nation.

This statement will present briefly a review of the water resources under three main headings:

1. Water resources of the area;
2. Accomplishments in water resource development;
3. Policy and program needs for the future.

Water resources of the area: History supports the contention that New England comprises one of the great industrial and recreational regions of the country. One of the most important factors contributing to this fact is the nature and extent of its water resources—ample in quantity and generally suitable in quality. They are also unusually well-distributed and reasonably accessible to the centers of demand. New England occupies an enviable position in this respect.

The water resources, in this 65,000 square mile area, are contained in thousands of lakes, ponds, and reservoirs with a total water surface areas estimated at 3,500 square miles and in over 75,000 miles of rivers and streams with drainage areas ranging in size from over 10,000

square miles to only a fraction of a square mile. An undetermined, but obviously large volume is hidden under the ground surface. New England is also fortunate in having a beautiful shoreline approximately 4,600 miles long.

The CHAIRMAN. Pardon me. Does your statement give the information as to the mileage of your navigable streams?

Mr. WISE. No, it does not, Senator.

The CHAIRMAN. Would you provide that information for the record?

Mr. WISE. I will be very glad to.

The CHAIRMAN. Very fine.

(The following information was supplied:)

In New England there are 2,977 miles of navigable waterways and in Massachusetts, there are 643 miles of navigable waterways.

Mr. WISE. This constitutes a tremendously valuable recreational asset, a source for industrial supplies where saline water is useful and also as an unlimited potential source of fresh water when salt water conversion becomes feasible and economical. Because of the large number of undeveloped potential fresh water supplies it does not seem likely that there will be a heavy demand for such water in the foreseeable future, except for special requirements.

Accomplishments in water resource development: The development of water resources in New England has reached its present stage largely through the efforts and initiative of private interests and by a people who traditionally have been doing things for themselves. Currently consideration is being given to providing storage in flood-control reservoirs for future supplemental water supplies. This has great merit in those areas where the future conditions may become critical, provided the beneficiaries bear an equitable share of the costs for this service.

The people of the New England States have generally adjusted themselves to the principles of State sovereignty in those matters affecting their economy. In those problems of regional scope, they have endeavored to find the solutions through interstate compacts and interstate agreements. This practice has proven to be very effective in the attack on broad scale complex problems and in uniting the people in a common interest for their common good.

In 1947 the States joined in a compact setting up the New England Interstate Water Pollution Control Commission of which we will hear more about, for the purpose of controlling pollution in interstate rivers and waterways, a fundamental step in the conservation of the region's water resources. The Connecticut River Valley Flood Control Commission was created in 1955 by the States of Vermont, New Hampshire, Massachusetts, and Connecticut to coordinate and program the construction of flood-control works on the Connecticut River watershed. In 1957 the States of Connecticut and Massachusetts created the Thames River Valley Flood Control Commission to coordinate efforts in reducing the ravages of floods in that valley. Less formal associations have served this region well in the numerous interstate problems.

The CHAIRMAN. May I interrupt to call attention to the fact that the dean of the United States House of Representatives, your own great John McCormack, just came into the room.

John, stand up and let the folks see you.

I know if you come over here and sit down you will create diversion and the committee will not get much attention, but we would still be glad to have you do it.

Representative McCormack. Where do you want me to sit, Bob?

The Chairman. Come right on up here.

Thank you, Mr. Wise, for letting us interrupt you.

Mr. Wise. This region was the locale of the most outstanding experiment in Federal-State relations ever undertaken in this country. Through a Presidential directive in 1950 the New England-New York Interagency Committee was created to make a thorough study of the natural resources in this area.

The Chairman. I would like to interrupt right there and say to you that I sponsored that legislation in the National Congress that made that possible.

Mr. Wise. I am very happy to know that, sir.

The Chairman. The President made a directive creating that committee, but he did it on the basis of legislation which I sponsored in the Senate, and I must in frankness acknowledge to you that it was done as much for the benefit of a similar situation in the Arkansas and Red River basin as for the water basins of New England but it was my very happy privilege to sponsor the legislation that was offered in that directive.

Mr. Wise. Representatives from each of the seven States involved and from seven Federal agencies worked, struggled and compromised for 4 years to complete a factual report contained in 43 volumes and at a cost of over $5 million. This was the most comprehensive study of its type ever undertaken in the field of water and related natural resources.

Following the discharge of this committee the New England Governors, in 1956, through a charter, created the Northeastern Resource Committee with a similar membership of States—except New York—and Federal agencies to implement this report and its recommendations. In 1958, after 2 years of organizational endeavors, the Governors again indicated their interest in the continuation of the work of this committee in a memorandum of understanding between the States involved. The results of these efforts and the growing concern over resource problems have aroused public opinion strongly supporting a permanent and more effective status for this committee. Consequently legislation in the form of a compact, between the New England States and the Federal Government, was introduced into the States' general assemblies in 1959. There will be more details presented concerning the operation of this committee.

Four States, Connecticut, Massachusetts, New Hampshire, and Rhode Island, already have approved this document and the northeastern water and related land resources compact will be presented for action in the next session of Congress. If enacted this could become the most useful agency for coordinating the conservation and development of natural resources in this region .

With few exceptions the public water supplies of this region are obtained from unpolluted sources and therefore the States have always diligently followed a strong policy seeking to protect the quality of the waters for future expansion and development. New

England has pioneered in stream pollution control and some of the early treatment works were constructed here. The different States, individually and collectively, are engaged in other programs involving certain phases of water resource management, such as flood control, shore and beach erosion control, stream encroachment control, dredging and construction in tidal and navigable waters, supervision of dams and drainage. Cooperative programs have long been carried out with Federal agencies—Army Engineers and Geological Survey—on flood control, beach erosion control, stream gaging, ground water investigations, quality of water studies and geological mapping.

In the realm of law of water rights and water use the New England States have generally followed the common law of riparian rights. The general adoption of this principle by the States in the eastern and midwestern portion of the country has caused this to be referred to frequently as the eastern law in contrast to the western law followed by those States in the western part of the country.

The doctrine of riparian rights has adequately served the growth and prosperity of this region and while some of the States are examining their laws in this field to determine if they are outmoded, it is questionable if changes are found to be necessary, that they will be based extensively on the western doctrine.

Policy and program for the future: The fields of water resource investigation and management are becoming overcrowded with activities of multifarious agencies—both governmental and private—which if uncontrolled might cause a confused condition approaching chaos. Initiative and competence should not be suppressed but proper channels should be established for directing the activities toward their maximum productivity.

A partial cause of this perplexing situation is the reluctance of Federal and State governments in setting forth policies and indicating possible guide lines for action.

Then, too, it has frequently been claimed that the only method of attack on this problem is from the top level of government down rather than from the lower levels of government and activity up. It is obvious that all levels of government and activity must participate but each of its own special sphere of influence and responsibility.

In line with this premise the most important and fundamental first step is the establishment of a sound national water policy. This policy should set forth six areas of principles and cooperative intent:

1. Recognize the differences in water problems, water rights and water law existing between regions—especially the contrasting doctrines followed in the Eastern and Western sections of the country.

2. Encourage and facilitate participation by private interests or agencies to attract the wealth of competence and ability available in this sphere of action.

3. Encourage establishment of regional agencies and authorize binding agreements or compacts between the Federal Government and such agencies for positive, cooperative action.

4. Assure participation by State or local governments consistent with the impact upon the economy of the respective areas.

5. Delineate the functions and responsibilities of the various Federal agencies involved in water resources problems to avoid duplication and confusion in administration.

6. Set forth procedures for coordinating and channeling the activities of all agencies involved.

Conflicts now exist between Federal and State governments and with the increasing attention being given to water resource matters by both governments it is likely that the conflicts will become more acute. A clear-cut national water policy could prove to be a great boon to sound resource development and should stimulate establishment of State water policies without risk of conflict with Federal piecemeal policies and procedures.

Congress has set a pattern for Federal assistance to the States and local communities in the construction of stream pollution control facilities through Public Law 660. This has greatly stimulated the construction of necessary treatment facilities to the extent that in some areas there are substantial backlogs of plans awaiting availability of Federal funds. The pollution control programs in New England would be greatly advanced if Congress provided increased funds for both construction and programing until the backlog of construction is reduced. It then should determine what policies would best maintain this program in a fluid and active state, recognizing that the State and local communities should bear their fair share of responsibility and support.

There is a great need for overall comprehensive planning to care for the many problems confronting the economy of local communities. These programs have been advanced by interest-free loans through the Federal Housing and Home Finance Agency. This service should be continued until the urgency has abated.

A well-developed navigation system is as important to the Nation as it is to New England. The harbors of this region have not been as intensively developed for use by modern deepwater transportation craft as has been done in other areas. The needs for deeper harbors in New England must be recognized and positive steps taken to insure their construction in the near future.

In the fields of flood control, tidal flooding, and hurricane protection, shore erosion, geologic mapping, surface and ground water studies, the appropriate Federal agencies have provided invaluable assistance and support in carrying out these programs cooperatively with the respective States. From time to time the needs for temporarily accelerating these programs in certain areas becomes critical and provisions should be made for meeting these demands with the requirement of a fair share of support and participation by the States involved.

The water problems of New England, thinking of it as a region as a whole, are not as critical as they are in other sections of the Nation.

Time is in our favor, but there is a common belief that this situation will not continue indefinitely. There is also a very real determination to prevent a lackadaisical approach to advance planning for meeting the future needs on both the State and Federal levels.

Public sentiment strongly favors coordination and programing on a regional basis such as is contemplated under the northeastern water and related land resources compact.

This would provide a sound and most effective procedure for a real Federal-State-local cooperative action. To demonstrate the productiveness of this plan and to assure an abundant future New Eng-

land needs the helpful assistance of a sympathetic Congress, which could partially be supplied by favorable consideration of the previously suggested policies and procedures.

The CHAIRMAN. Thank you very much, Mr. Wise, for a fine statement. I want you to know that I have been impressed and I know the other members of this committee were by your statement about the hospitality of your fine region, and I say to you that we are keenly aware of that and it is a source of deep gratification.

Mr. WISE. Mr. Chairman, I also represent the State of Connecticut, and I have a prepared statment which I will give to the committee, but I would just like to emphasize a few things about it.

The CHAIRMAN. Fine. You be at ease and do that.

Mr. WISE. In 1955, the State of Connecticut had a study made of its water resources, and a copy of that report has been supplied to your staff so that the information would be available.

I also would like to speak about pollution control, and at the present time plants in operation and under construction will be treating 94 percent of all the municipal waste in the State of Connecticut.

During the past 10 years, we have increased that percentage from 63 to 94 percent and some of that has been due to the stimulation from Federal grants, although Connecticut is one of those States which has a big backlog of plans awaiting Federal funds. We have also undertaken rather extensive programs on the State level to care for flood control, and we are administering one of the comprehensive stream encroachment laws of this region which obviously is the first step in a flood plains zoning project.

And, lastly, the State has authorized the Water Resource Commission to make a complete inventory of all the water resources in the State, both surface and ground.

The CHAIRMAN. What progress has been made heretofore with reference to evaluating and tabulating knowledge from the ground resources?

Mr. WISE. The only information that has been made available is with the limited cooperative program with the U.S. Geological Survey.

We have been carrying that on for about 15 years on a very small scale but to meet our demands we need to expand that tremendously, and that is why the legislature has authorized us to make this complete survey over a 10-year period.

Unfortunately, they did not provide any funds and maybe this committee could maybe influence our legislature that something like that was necessary. Thank you very much.

The CHAIRMAN. Thank you very much, Mr. Wise.

(The prepared statement referred to follows:)

STATEMENT BY WILLIAM S. WISE, DIRECTOR, CONNECTICUT WATER RESOURCES COMMISSION

This statement presents briefly, under three main headings, a review of Connecticut's water resources and the problems involving their development, use, and conservation:

(1) Nature and extent of these resources.
(2) Activities and present state of their development.
(3) Policies and programs for meeting anticipated future needs.

NATURE AND EXTENT OF THE STATE'S WATER RESOURCES

Connecticut is a small State blessed by nature with abundant water resources, well distributed to meet the needs of a progressive and industrious people. The quality as well as the quantity of surface water were important factors in attracting the textile and other water-using industries during the early history of the State. Today Connecticut is one of the most industrialized States in the country, due in large measure to its favorable water resources, even though some of the early textile industries have been migrating to Southern States for reasons other than those relating to water supply. Connecticut industries are not in the large water use category.

The surface waters are available from 8,500 miles of streams and rivers varying in size from brooks with small drainage areas to the Connecticut River having a watershed of over 10,000 square miles. In addition to these sources there are over 1,000 lakes, ponds, and reservoirs, of utility size, with total water surface area of nearly 100,000 acres.

The groundwater sources with widely varying yields are well distributed throughout the State and reasonably accessible for the various uses and demands. The quality in general is excellent and comparatively soft, usually suitable for most purposes. There is a serious lack of information covering specific locations and volumes of these resources and their potential yields.

Another valuable State asset is its shore line adjacent to Long Island Sound with a total wetted perimeter of about 250 miles. This furnishes excellent facilities for the rapidly growing salt water recreational needs and those industrial operations in which saline water can be utilized. It also constitutes an almost unlimited source of fresh water, when salt water conversion becomes feasible and economical, and when the demand arises. No point in the State is more than 60 miles (airline miles) from this important body of water.

ACTIVITIES AND PRESENT STATE OF WATER RESOURCE DEVELOPMENT

The development of water resources in Connecticut has reached its present state largely through the efforts and know-how of private enterprise. For this the citizens should be forever grateful, and they should steadfastly guard against any encroachment upon this effective policy. However, it must be obvious to everyone that, because of the increasing conflicts of interest, Government must step in to correct or compromise conditions which otherwise might become roadblocks to progress. Connecticut has always been cognizant of the need for a healthy relationship between government and private enterprise, and consequently it has a long, proud history of sound and progressive government, constantly blending the stabilizing policies inherited from customs and tradition with progressive principles established to meet the complex problems of modern life.

Forty years ago this State initiated studies aimed at preserving the inestimable value of its clean streams. Five years later it adopted a comprehensive water-pollution-control program to keep the clean streams clean and restore the polluted streams to a quality where they again could serve useful purposes and growing needs. The pollution of interstate tidal waters became more serious and in 1941 Connecticut joined in a compact with the States of New York and New Jersey through the Interstate Sanitation Commission to control the pollution of the waters of Long Island Sound. In 1947 the State joined with other New England States to control pollution on interstate rivers through the New England Interstate Water Pollution Control Commission. These programs have contributed immeasurably to the conservation of the State's surface water resources.

In 1930 the State entered into an agreement with the U.S. Geological Survey for carrying on a cooperative program of measuring the flow of water in specific rivers. Forty-four gaging stations are continuously operated throughout the States. In 1944 a similar agreement was made with the same agency to gather information on the availability of ground water in the State and since 1955 a water quality study has been conducted under the same cooperative arrangements. Since 1957 the State has been participating in a cooperative geological mapping program by the U.S. Geological Survey as a vital tool for gathering ground water and other valuable information. All of these programs should be expanded to meet present heavy demands for these vital data. The solution of many water problems involved the use of dependable information on floodflows in Connecticut rivers and in 1953 the U.S. Geological Survey published

"A Flood-Flow Formula for Connecticut" as a result of a cooperative study by that agency and the State water commission and State highway department.

From 1950 to 1954 Connecticut participated in the work of the New England-New York Interagency Committee created by a Presidential directive to inventory the natural resources of New England and New York. This probably was the most comprehensive study ever undertaken in any region of the country to determine the water and other natural resources available in a particular area. A report comprising 43 volumes was prepared at an approximate cost of $5 million. This was an outstanding adventure and experiment in Federal-State cooperation, where representatives from seven Federal agencies and seven States through persistence, disputes and compromise completed a most creditable project. After the Committee was discharged the New England Governors, in 1956, created the Northeastern Resources Committee to implement the work and the recommendations of this report. Legislation was introduced in all the New England State legislatures in 1959 proposing a strong, binding compact between the States, and those Federal agencies engaged in water resource problems, in order to provide a more effective agency. Its object is to coordinate and plan the development of all the natural resources of this region on an orderly and sound basis. Connecticut approved this legislation.

In 1955 the Connecticut General Assembly concluded that more specific data was needed on the State's water resources and it authorized a study commission to report on this matter to the 1957 legislative session. This report, entitled "Water Resources of Connecticut," contains the most complete information available on this problem. Among other things it found that 85 percent of the State's population is supplied from public water systems obtained from substantially unpolluted rivers and streams. It also found the present supplies for some areas and municipalities to be inadequate; however, it concluded that in the States as a whole with proper planning and development the water resources should be adequate to supply the needs for the next 50 years based on an anticipated population growth which appeared reasonable at this time. This population growth figure has since been substantially revised and therefore critical water conditions may be experienced in a number of areas within several decades. The report emphasized the need for expanding the present programs for gathering groundwater data.

The 1959 session of the general assembly authorized the State water resources commission to make a complete inventory of the water resources of the State—both surface and ground. The same legislature also authorized an economic study of the State and this report emphasizes the competitive advantages of the State because of its excellent water resources and the programs looking toward their conservation. It further stressed the urgent need for expanding its basic data-gathering programs and activities.

In an effort to preserve the State's shoreline the 1947 legislature authorized a cooperative study with the U.S. Army Engineers to control erosion. Since 1955 the State has been carrying on a beach and shore erosion control program at a cost of $1 million per year having constructed over 11 miles of new beaches accommodating 200,000 bathers per day. Following the disastrous floods of 1955 the general assembly provided funds for new legislation and amended existing legislation to permit expanded cooperative programs with the Army engineers on flood-control works and authorize the State to carry out needed works beyond the scope of the Federal agency such as the establishment of stream encroachment lines and stream channel improvements. Over $4,500,000 have been authorized and some of these programs have attracted national attention because of the pioneering and unusual principles involved.

It must be evident from this record that Connecticut has long recognized the need of conservation and development of its water resources and has consistently instituted constructive measures to insure its future growth, prosperity, and welfare.

Policies and programs to meet future needs

The fields of water resource investigation and management are becoming overcrowded with activities of multifarious agencies—both governmental and private—which if uncontrolled might cause a confused condition approaching chaos. Initiative and competence should not be suppressed but proper channels should be established for directing the activities toward their maximum productivity.

A partial cause of this perplexing situation is the reluctance of Federal and State governments in setting forth policies and indicating possible guidelines

for action. Then, too, it has frequently been claimed that the only method of attack on this problem is from the top level of government down rather than from the lower levels of government and activity up. It is obvious that all levels of government and activity must participate but each in its own special sphere of influence and responsibility.

In line with this premise the most important and fundamental first step is the establishment of a sound national water policy. This policy should consider six areas of principles and cooperative intent:

1. Recognize the differences in water problems, water rights, and water laws existing between regions—especially the contrasting doctrines followed in the eastern and western sections of the country.

2. Encourage and facilitate participation by private interests or private agencies in order to attract the wealth of competence and ability available in this sphere of human endeavor.

3. Encourage the establishment of regional agencies and authorize binding agreements or compacts between the Federal Government and such agencies to promote more positive, cooperative and effective action.

4. Assure full participation by State and local governments consistent with the impact upon the economy of the respective areas.

5. Delineate the functions and responsibilities of the various Federal agencies involved in water resources problems to avoid duplication and confusion in administration.

6. Set forth procedures for coordinating and channeling the activities of all agencies involved to minimize conflicts and duplication of efforts.

Conflicts now exist between Federal and State Governments and with the increasing attention being given to water resource matters by both governments it is likely that these conflicts will become more acute. A clean cut national water policy could prove to be a great boon to sound resource development and should stimulate establishment of State water policies without risk of conflict with Federal piecemeal policies and procedures.

Congress has set a pattern for Federal assistance to the States and local communities in the construction of stream pollution control facilities through Public Law 660. This has greatly stimulated the construction of necessary treatment facilities to the extent that in Connecticut substantial backlogs of plans are awaiting availability of Federal funds. The pollution control program in Connecticut would be advanced if Congress provided increased funds for both construction and programming until the backlog of construction is reduced. It then should determine what policies would best maintain this program in an effective status recognizing that the State and local communities should bear their fair share of responsibility and support.

There is a great need for overall comprehensive planning to care for the many problems confronting the economy of local communities. These programs have been advanced by interest free loans through the Federal Housing and Home Finance Agency. This service should be continued until the urgency has abated.

One of Connecticut's most urgent needs, as has been previously indicated, is a complete inventory of its water resources. This is largely dependent upon the geological mapping program and the surface, ground and quality of water programs carried on through the U.S. Geological Survey cooperative programs. It is essential for this work to be carried on by the present Federal agency which has set the pattern for accuracy and completeness so that the data is comparable for all States. These programs should be greatly expanded.

Connecticut has many other problems in this field, among them an appraisal of its water laws and water rights to determine if they are adequate to meet future requirements. It also needs a comprehensive harbor development program on its navigable waters. A program for development of small-boat harbors is particularly needed to complement its present shore erosion control program. Connecticut needs the advantages offered by a regional approach and coordination as is contemplated in the northeastern water and related land resources compact already passed by the legislatures of four New England States. Congress should approve this compact without delay.

As has been pointed out previously because of its generally abundant water resources, the immediate water supply needs are not nearly as critical as they are in other States. Time is in Connecticut's favor, but it wants to lose no time in setting up a sound and comprehensive water program to meet the future inevitable demands. To make this program completely workable and effective the assistance of a sympathetic Congress is necessary in line with some of the suggestions listed above.

The CHAIRMAN. The State of Vermont is represented here by its commissioner of State water conservation board, Mr. Reinhold W. Thieme.

Come around and we will hear your statement.

STATEMENT OF REINHOLD W. THIEME, COMMISSIONER, STATE WATER CONSERVATION BOARD, STATE OF VERMONT

Mr. THIEME. Honorable Chairman, members of the Senate Select Committee, I am very happy to appear on behalf of the State of Vermont to offer some comments.

Last week I had the privilege of talking with Bill Wise about his paper which was presented on the part of the New England Governors.

After learning that, in the interest of brevity, I went home and reworked my paper so I might reduce it somewhat and reduce somewhat the repetition of facts.

For that reason I am sorry that I cannot give you all copies of my paper because actually I did not have time to have that accomplished yesterday.

Before I get into my paper I would like to make just a few comments about Vermont and its approach to water problems.

In 1947 our general assembly did declare it to be the policy of the State that the water resources of the State should be protected, regulated, and, where necessary, controlled under the authority of that State in the public interest and at that time did declare the water conservation board to be the State's agent in those activities.

Briefly, what this board is responsible for is a pretty broad picture of State water resources. It is the State's agent in all matters relating to flood control. It is the State's agent in studying the watersheds of the State. It is the cooperating agent with the USGS in measuring streamflows. It is the State's agent in pollution control matters and is also responsible for the safety of dams and is the Governor's representative in reviewing applications for projects under the watershed protection, flood prevention act of recent vintage.

So I think you can see that the water conservation board has been given rather broad powers and has rather broad interests in water resources matters.

Now, coming to my paper itself, my statement that I would like to present at this time:

Actually, New England has long been considered to be a region of the country with common problems. We New Englanders take great pride in our heritage and in our long-standing record of standing together to overcome these common problems. Through the years, a number of mechanisms have been developed to further this cause. For example, the Governors meet quarterly in the Governors' conference to cover problems of mutual concern and, in addition, a good number of interstate compacts have been ratified by Congress and adopted by our New England States to enable them to provide a common approach to interstate problems.

Several of these relate to our water resources, to name a few of them, they have already been mentioned, but we have them in pollution control, flood control, and other matters.

With this background, then, it is not surprising that New England should again join together, and this time provide a unified state-

ment on the part of the Governors' conference. Vermont wishes to record its endorsement for and its support of that statement.

Actually, this statement does reduce greatly the amount of material that I would have to present, but I would like to give you a few facts as to the nature and extent of Vermont's water resources, the extent presently planned water resources activities, and also to make several recommendations to your committee concerning areas in which we feel the Federal Government can be most helpful.

Vermont has been generously endowed by nature with an abundance of clear, cold water. It is likely that our sparkling mountain streams, rivers, lakes, and ponds first attracted many of our ancestors to this State. Down through the years, Vermont waters have supported our lives, our agriculture, and our industry. More than 2,000 miles of streams with a minimum drainage area of 10 square miles water our countryside. In addition, more than 240 lakes and ponds having a surface area of 20 acres or more dot our countryside. The total surface area of these lakes and ponds is estimated to be 350 square miles. In fact, Vermont's entire eastern boundary is water, the Connecticut River, and more than 65 percent of our western boundary is likewise water—Lake Champlain and its tributary, the Poultney River. Small wonder, then, that the New England-New York Interagency Committee reported that there will be a surplus of water available in most parts of this region, that is, New England, at least until the year 2000.

However, this abundance of streams and a mountainous terrain has contributed greatly to a flood problem, both within our State and those States in downstream areas. This situation has resulted in the comprehensive flood-control plan for the Connecticut River as prepared by the New England Division, Army Corps of Engineers.

This plan encompasses some 22 dams for the Connecticut watershed, in addition to which certain local protective workers will also be required. Of these 22 dams, 12 will be located within the boundaries of Vermont, most of them to be constructed very close to the mouth of our Vermont streams with the result that very little Vermont property will receive flood protection. Four of these dams are presently under construction and one has been completed for about 10 years.

Many Vermonters recognize that the lands for these dams must be sacrificed for the protection of the many downstream landowners. However, they also feel that their landowners must be given every opportunity to relocate with a minimum of hardship and financial sacrifice. For this reason, we would recommend review of the present Federal land acquisition policy which does result in personal hardships under many circumstances.

Knowledge of streamflow is fundamental in any program of water resources development. In recognition of this, 38 stream gaging stations are presently maintained in Vermont, under the program of cooperative studies with the United States Geological Surface Waters Branch. Analysis of 956 station years of record has just been made to determine, by an electronic computer to determine the highest mean and lowest mean discharges of our rivers. We hope that this data will soon be published and therefore be helpful to everyone.

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Reliable information has not been available in the past regarding the underwater characteristics of Vermont lakes and ponds. This past year a program of mapping these underwater features was begun using electronic means. This initial program has proved to be quite successful and it is expected that these activities will be continued during the coming summers. These mapping operations will reveal in detail the quantity of the waters that are stored within these different lakes and ponds, as also provide navigation charts for our rapidly increasing boating public.

Because we have always had an abundance of clean water, many have felt that the supply was inexhaustible. Through careless use, many of our streams were allowed to become polluted to a point where they lost much of their usefulness.

The Vermont Legislature, long ago recognized the fallacy of these careless ways and did pass appropriate legislation to overcome this pollution problem. In 1949, the Vermont State Water Conservation Board was named as the State's pollution control agency. Soon thereafter an intensive program of study and public education was undertaken and the classification of the waters for the best future use was begun. In 1957, legislation was passed to provide State aid for the construction of necessary sewage treatment facilities and appropriate appurtenances. It is interesting to note that the 1959 legislature again looked at this problem and made an additional $1 million available to us.

Under the provisions of the act, the State would participate to the extent of 20 percent of the total cost of construction for eligible facilities.

The CHAIRMAN. Participation of 20 percent, that means local communities now have adequate facilities putting up 50 percent of costs.

Mr. THIEME. Roughly speaking that is correct; yes.

This State grant program coupled with Public Law 660, 84th Congress, and the provisions of section 702 of Public Law 560, 83d Congress, providing interest-free planning advances to cover the cost of engineering, has created great interest in our State. In 2½ years, since the passage of our act, 10 communities have voted to build necessary facilities at a cost of approximately $5¼ million.

In addition to these 10 communities, another 25 communities have retained engineers to prepare the basic engineering for their needed facilities. Needless to say, we in Vermont feel a $5¼ million program of sewage treatment construction in 2½ years is very honest recognition of the need to preserve our water resources.

This becomes particularly significant when we recall Vermont's population is slightly less than 400,000. This high level of activity cannot be maintained in Vermont without the continued participation by the Federal Government through the provisions of program and construction grants under Public Law 660, 84th Congress, and the continued availability of planning funds through the House and Home Finance Agency, Community Facilities Administration.

We therefore recommend prompt action by Congress to see that these two worthwhile programs are continued at an adequate level.

Further recommendations that I would make for the consideration of your committee are as follows:

(*a*) That the Federal Government play a dominant role in research relating to our water resources; this should include but not be limited

to improved waste treatment developments, hurricane studies, basic hydrology, to name but a few;

(*b*) That Congress hasten to amend existing flood insurance legislation to provide a fully workable plan that could be quickly undertaken, if and when the need arises; we would recommend an amendment similar to that developed by the flood insurance committee of the Council of State Governments;

(*c*) We would urge Congress to support the concept of State responsibility for the administration of the basic water resources programs and that it protect State water law;

(*d*) That Congress review existing legislation relating to water resources development with an eye toward the full development of water resources to each project;

(*e*) That Congress support the regional approach to interstate problems, particularly those related to the development of water resources. This regional approach should be adequately formalized through interstate compact with provisions for Federal participation.

That would be somewhat similar to that proposed by Mr. Wise when he referred to the northeastern water and related plan resources compact.

That is my statement, gentlemen, and I appreciate the opportunity of appearing before you.

The CHAIRMAN. Thank you very much, Mr. Thieme, for a good statement.

The CHAIRMAN. The State of Rhode Island is represented here by the Rhode Island Water Resources Coordinating Board, Mr. Walter Shea.

STATEMENT OF WALTER J. SHEA, CHAIRMAN, RHODE ISLAND WATER RESOURCES COORDINATING BOARD

Mr. SHEA. Mr. Chairman and members of the United States Senate Select Committee on National Water Resources.

I am Walter J. Shea, chairman of the Rhode Island Water Resources Coordinating Board, here to present some comments on Rhode Island's water problems.

The board I represent has no technical staff available to prepare an elaborate analysis of the State's water problems. I am, therefore, equipped only to touch briefly, in a general way, on these matters.

Public water supply: Like the other New England States, Rhode Island enjoys a rather generous rainfall, for the whole State it averages 43.3 inches annually. This rainfall is, ordinarily, fairly well distributed throughout the year. Despite these favorable conditions, occasionally a dry year occurs and sometimes a succession of dry years. These periods result in water shortages in those municipalities having a water source and storage sufficient to meet demands of the average year only.

There exists an immediate need for more adequate supplies in these cases. Steady population growth demands that steps be taken to assure an adequate supply in the future when existing water supply developments will no longer be able to meet the demand. The Rhode Island Water Resources Board has obtained engineering studies on this problem and is now near the stage of making specific recommen-

dations to the Governor and the State legislature for dealing with it in long range.

In Rhode Island, public water supply has been the responsibility of the cities and towns. It is felt that soon the State government will have to participate. It appears, however, that the water supply needs of the foreseeable future can be met without appealing to the Federal Government for aid.

Water pollution: The Federal Government is already active in the field of water pollution control. This activity is felt to be proper and should be continued. When other measures have failed to control pollution of interstate waters which originates in one State and damages another, resort must be made to the Federal Government for action.

The construction grant program for publicly owned waste-treatment facilities now in effect no doubt has proved of value to many States. Its value in Rhode Island, however, has been limited because of special circumstances. The establishment of adequate sewage-treatment facilities in Rhode Island communities was so well advanced when the program was begun in 1957 that few communities have been eligible for this assistance. Of the sum of $2,070,000 made available to Rhode Island so far, only $860,365, or 42 percent of the total, have been utilized.

Yet, one community facing many burdensome public works undertakings, including a new sewage-treatment plant to cost $5 million, can be granted maximum aid of $250,000, only 5 percent of the cost. This meager aid, of course, provides little incentive to that municipality to go ahead. It seems that the construction grant program should be liberalized to permit full utilization of the construction grant funds allotted to Rhode Island. Under the present restrictions, the State is in the position of losing most of its share of aid because its communities were, in the past, too ready to meet their sewage-disposal obligations promptly.

Before leaving the subject of waste pollution, may I add my voice to those that point out the need for some form of tax relief for industries obliged to develop expensive waste-treatment facilities.

I should also like to point to the need of more attention being given the problem of pollution of harbors and inland waterways by the sewage discharged from ships, in particular those of the U.S. Navy.

Flood control: Damage caused by floodwaters in periods of extraordinary runoff has been extensive in one drainage basin in the State. The engineering and financial aid that have been given by the Federal Government will remove the danger of a recurrence of this damage.

It is hoped that plans now developed by the Corps of Engineers for the construction of hurricane barriers will be carried out so as to prevent the large-scale hurricane disasters of the past being repeated in future hurricanes.

In common with other coastal regions, Rhode Island struggles to prevent beach erosion, and to maintain adequate ship channels for modern vessels of deep draft. The continuing assistance of the Federal Government in these matters is certainly indicated.

In summary, may I say that I have attempted to briefly outline the more important water resource problems that confront the State of Rhode Island and the need for Federal assistance in some. Realizing the diversity of water problems throughout the Nation, and their com-

plexity, I am in no position to offer you recommendations for an overall solution. I hope only that I may have made you somewhat more familiar with those of my own State.

Thank you very much.

The CHAIRMAN. Thank you very much, Mr. Shea. We are happy to have you and your constructive statement.

Is Mr. Alvin C. Watson, of the Northeastern Resources Committee, here? All right, Mr. Watson.

STATEMENT OF ALVIN C. WATSON, CHAIRMAN, NORTHEASTERN RESOURCES COMMITTEE

Mr. WATSON. I appear here as chairman of the Northeastern Resources Committee. I think I should say, however, that my job is in the water resources field, representing the U.S. Department of Agriculture from the Potomac to Maine in the eastern area of the country.

I am employed by the Soil Conservation Service.

My name is Alvin C. Watson, chairman of the Northeastern Resources Committee. It is a pleasure to make this statement on behalf of NRC. We hope it will add to the useful information your committee is obtaining and that it may be helpful to the overall objectives of your committee.

My purpose is to tell you briefly what the Northeastern Resources Committee is, its purpose, aims, and objectives, and something of its accomplishments during the 3 years of existence. We are dedicated to the harmonious and beneficial development of the water and related land resources, in line with the needs and problems of this region.

The Committee operates under a memorandum of understanding approved by the six Governors of the New England States and a charter issued by the Interagency Committee on Water Resources in Washington. Each Governor has appointed a representative to this Committee, and the seven Federal departments concerned with water resources development have each named a representative.

I would like to say at this point there are seven or eight members of this Committee here today. In fact, Mr. Wise, Mr. Sterling, and Mr. Thieme are members of the Committee and have already appeared before you.

The CHAIRMAN. Are the other members present scheduled to appear?

Mr. WATSON. Not to appear; but several of them are here.

The CHAIRMAN. Would you like to introduce them and let us see them?

Mr. WATSON. General Sibley has already been introduced but he is still with us, I see, representing the Department of the Army. Mr. White, representing New Hampshire.

The CHAIRMAN. Mr. White gave us a very fine statement yesterday at Augusta, Maine.

Mr. WATSON. Mr. Martin, representing the Department of Health, Education, and Welfare; Mr. Dittbrenner, representing the Commerce Department. Mr. Abelson, representing the Interior Department.

Have I missed anyone?

The CHAIRMAN. Thank you.

Mr. WATSON. The Committee meets at approximately monthly intervals for 1 or 2 days' duration. In the present fiscal year, for example, we have a series of 10 meetings scheduled, 6 of which will be open to the public, and be held in the respective States. The Committee operates without any funds.

Its activities are carried on by the respective members through services that they are able to provide. This works very well for some things; but, as you probably know, a committee of this kind without funds is handicapped. We do not duplicate the work of any single existing agency.

Our chief function is the coordination of all facets of water and land resource development in the New England area. Specifically, the Committee is concerned with (1) the collection and interpretation of basic data; (2) the investigation and planning of water and related land resources; and (3) the programing, timing, and fitting together of project developments.

It operates in somewhat an informal way, using the power of understanding, good will, and persuasion. In other words, we operate through cooperation. I should say, at this point, that one of the things which led to the formation of this State-Federal interagency committee was the completion of the New England-New York Interagency Committee report a few years ago. This report is a very comprehensive inventory of the water and related land resources in the New England States and a portion of New York.

The States felt that this report should be kept alive, kept up to date, understood, and used to the maximum. The NRC has for an objective maximizing the usefulness of this report by the agencies at all levels which are concerned with water resource developments. The report is in the hands of, or available to, all agencies.

Among our accomplishments, we can list a very simple one of knowing and understanding what the agencies of the State and Federal Governments do in their respective fields and knowing each other personally. When good understandings exist among agencies and people, among States and the Federal Government and other agencies, we find that many of the so-called conflicts disappear or become solvable.

Another of our accomplishments has been a series of public meetings held in 1958 where an analysis was made of the NENYIAC report as it applies to each of the States. These meetings were each attended by several hundred leaders, who displayed great interest in and made contributions to the thinking with respect to water and related land resource developments in this region. I might add to my paper at this point that we found this series of meetings completed in 1958, to be exceedingly helpful. We considered an endorsement from the public of the idea of interagency coordination in the region here.

The State representatives of NRC have felt, since the beginning of this Committee, that there should be a more formal basis to the structure of the organization. Accordingly, a compact bill was drawn up, which provides for a continuation of the functions of the NRC, with the same powers as now vested in it under the existing charter. The purpose of this State-Federal compact is to give improved legal status and permanency to our Committee and to provide a systematic

way of making relatively small amounts of money available to the Committee. One reason the Committee has for funds is the establishment of a small central office for the purpose of centralizing records and reports and to handle the administrative details of the Committee.

Four States—New Hampshire, Massachusetts, Connecticut, and Rhode Island—have passed this legislation during 1959. It may become operative when three or more States have passed it and it is ratified by the Congress with provision for Federal membership. The next step is consideration of this compact by the Congress of the United States.

Another recent advance of NRC has been the formulation of technical subcommittees to deal with matters of policy and procedure, which, I might add some of which have been brought out here this morning, which very often are at the core of successful water resource developments. These committees cover the fields of (1) hydrology, basic data, and weather; (2) evaluation standards; (3) water rights; (4) pollution abatement and water quality; (5) recreation, fish and wildlife, and beach erosion; (6) construction and maintenance; (7) water resources, conservation, and development.

About 75 technical and scientific workers from Federal and State agencies and private sources here in New England have agreed to serve on these various technical subcommittees.

To sum up, let me say that the Northeastern Resources Committee is encouraging the existing State, Federal, and local agencies to do the jobs for which they have responsibilities and to do them well, and further we are attempting to see that the various water and related land resource developments fit together properly in the best interests of all concerned to meet present and future needs.

To my remarks is attached a copy of our annual report for the year ending June 30, 1959, which contains, in appendix form: (1) the memorandum of understanding, relative to the Northeastern Resource Committee, signed by the six Governors; (2) the charter for the Northeastern Resource Committee issued by the ICWR in Washington; (3) the copy of the compact that has been proposed and passed by four States; (4) an excerpt from minutes of the meeting from the New England Governors' Conference of 1959, dealing with the compact; and (5) a brief statement summarizing the subcommittee plans of NRC.

The CHAIRMAN. We are glad to have this exhibit which will be filed with the committee.

Mr. WATSON. I want to close my remarks by saying that New England has contributed, over the years, greatly to the development of this Nation. While physical conditions and distances here differ from other sections of the country, such as our great Southwest, we do have serious problems of water supply, flood control, land use, pollution abatement, recreational needs and developments, and others which are very urgent to the welfare of the people and significant indeed to the Nation as a whole. Because of the relatively high degree of business and industrial developments, the present population densities, and the population explosion which is occurring, these problems are usually very complex. They do require the best efforts of the Federal and State governments and the maximum assistance from each.

I thank you.

The CHAIRMAN. Thank you very much, Mr. Watson.

I would like to ask you, and I am not sure you made it clear—it may be that you did—has the Federal legislation to which you refer been introduced for the approval of this compact?

Mr. WATSON. No. It is contemplated that that will be done at the next session.

The CHAIRMAN. At the next session in 1960?

Mr. WATSON. Right.

The CHAIRMAN. Thank you very much, sir, for your statement.

Senator HART. Mr. Chairman?

The CHAIRMAN. Senator Hart has a question.

Senator HART. In connection with your observation that you are responsible for the soil conservation district aspect, as far as the Department of Agriculture is concerned, from the Potomac through to Maine, in the course of these hearings we have had some comment with respect to the Small Watershed Act.

Indeed, this morning, comment was made that applied to Massachusetts where there was a concentrated population. There were limitations. I am sure that the committee would appreciate your comment based on the experience you have had in this region.

Mr. WATSON. I of course do not have the administration of the operating program under my wing. I am concerned with the long-range plan. However, the small watershed program is a relatively new program. It got off to a pretty good start in the South, and in the West, a rapid start.

I am happy to say to you that in this area that I serve in, West Virginia is not taking any back seat in the development of this program to any other place. It has been slow in Pennsylvania, but they are now getting underway. It has been even slower in New England. What the reasons are for this I am not able to say. I can say this, however, which is encouraging, that two projects have recently been authorized in the State of Connecticut. Am I correct, Bill? Two just recently have been authorized in the State of Connecticut.

So generally speaking I would say that the program has been a little slow to develop here, not that there has not been interest but the ramifications of the program do not seem to quite fit here as well as they do in the great open spaces.

Senator HART. I take it at the moment you are not in a position to suggest changes that might make it more usable.

Mr. WATSON. No, I am not. I think it merits some pretty good study, though.

The CHAIRMAN. Thanks very much, Mr. Watson.

Is Mr. Warren Gentner here?

Mr. Gentner, what time will you need to make the presentation?

Mr. GENTNER. About 3 minutes.

The CHAIRMAN. Fine. Come around.

We are going to recess when you have completed your statement.

Mr. Gentner is with the New England Water Works Association.

STATEMENT OF WARREN A. GENTNER, PRESIDENT, NEW ENGLAND WATER WORKS ASSOCIATION

Mr. GENTNER. Mr. Chairman, and members of the Senate Select Committee on National Water Resources.

I am Warren A. Gentner, president of the New England Water Works Association and deputy manager and chief engineer of the Water Bureau of the Hartford Metropolitan District in Connecticut.

There has been a general feeling, until recently at least, that New England is endowed naturally with abundant supplies of water of suitable quality for domestic, agricultural, and most industrial uses.

In regard to the availability of water for future requirements and demands, the New England-New York Interagency Committee report on the resources of the New England-New York region, previously described at this hearing, states:

> There will be a surplus of water available in most parts of the region, at least to the year 2000. However, water use competition and pollution adversely affecting quality and use could result in water shortages in certain areas. Several populous areas with insufficient water resources could obtain additional supplies from adjacent river basins having a surplus of available water. While most of the surplus water resources are surface waters there is considerable undeveloped ground water available. Should there be a major trend toward increased supplemental irrigation in some areas, such use could significantly reduce the water available in small tributary streams.

It is not my purpose to discuss water supply needs in the area, which subject is being presented by the appropriate State agencies concerned with water resources, but to offer the assistance of the New England Water Works Association in your deliberations.

The association was established in 1882 for the advancement of knowledge relating to waterworks and water supplies. New England communities were aiming at first to install public water supplies and it was only natural that water supply engineers and officials should organize at such an early date. The membership of the association has grown to nearly 1,200, consisting of waterworks superintendents and commissioners, engineers, chemists, and waterworks equipment manufacturers.

At the monthly meetings and annual conventions of the association, these are technical sessions including discussions on the development of waterworks in the area. Such papers and discussions are published in the journal of the association which is issued quarterly.

The New England Water Works Association, almost from its inception, has developed standards and specifications for the profession and has had active technical committees covering all phases of waterworks development and operation, including a committee on rainfall and yield of drainage areas and a committee on ground water supplies.

In view of the increased interest in water resources and in the adoption of a national water policy, a committee on conservation, development, and utilization of water resources was established in 1951 to keep the association advised of developments in this field.

The New England Water Works Association appreciates the opportunity of participating in this hearing and offers its cooperation and facilities to your committee in the formulation of policies and legislation affecting the water resources of the country.

Thank you very much.

The CHAIRMAN. Thank you, Mr. Gentner.

This is the 22d hearing of this committee. Certainly it is one of the best. Here in New England you have had the opportunity, by reason of having been in the Union much longer than the various areas of our country west of the Appalachian Mountains, to acquire experience and knowledge about the conservation and use of water resources. We hope that this committee will be the vehicle through which the contributions which you have made here and in Maine, and at any other hearings which we may be privileged to hold in New England will be transmitted—not only to the Senate and the Congress, but to the country at large.

The committee will stand in recess until 12:30 at which time the other witnesses scheduled to appear will be heard.

The chairman deeply regrets that a situation has developed in Washington that will require his presence there at 3 o'clock this afternoon, but Senators Hart and Moss will continue and complete the hearing.

And I just want to express again my deep gratitude for the wonderful hospitality that we have been accorded here and congratulate you upon the very wonderful awareness that you have manifested of your problems and the constructive statements that you have contributed to us.

As I mentioned a while ago we are highly gratified at the presence here of the dean of the House of Representatives of the U.S. Congress, John McCormack.

Now, I know that few Senators, even in the U.S. Senate, ever had the opportunity of having such a wonderful audience as this to say a few words.

I might even say to you that there are nearly as many Senators here as are present sometimes when some of the great speeches are made in the U.S. Senate. Certainly, a Member of the House of Representatives would not want to remain silent in the presence of such an inspiring and gratifying audience.

John, do you have anything you want to say in the presence of these fine people here, to take advantage of this opportunity?

STATEMENT OF HON. JOHN W. McCORMACK, U.S. REPRESENTATIVE FROM THE STATE OF MASSACHUSETTS

Representative MCCORMACK. Of course, we operate in the House under the 5-minute rule as you well understand.

The CHAIRMAN. You see, this is a courtroom and not the House.

Representative MCCORMACK. I know.

I think it is a good example for the House Members to set for the Senate Members which apply even to public hearings, that is, the 5-minute rule.

The CHAIRMAN. Do you think that is entirely consistent with the spirit of hospitality these people accorded us?

Representative MCCORMACK. I have complete confidence in them.

The CHAIRMAN. They placed no restriction whatever on us, John.

Representative MCCORMACK. I want to express our appreciation to Senator Kerr and his colleagues for coming to Boston. Bob Kerr and I have been close personal friends for many years. He is one of the most dedicated Americans that I have ever met. He is one of

the most versatile and eloquent Members of the Congress that I have ever listened to and a man of profound mind, based on sound logic.

You have seen how he conducts a hearing here, in a gentlemanly manner making everybody feel at home. You see how his associates on the select committee have conducted the hearing with him. You have seen the hearing conducted which was in the highest level of the Congress of the United States, the dignity and the atmosphere of ascertaining facts and understanding, the views and the position of witnesses and the refinement of Senator Kerr and his two colleagues in the conduct of these hearings.

It is a pleasure for me to drop in. I might say I am vitally interested because I am the author of the bill, that you probably remember, Bob, but your two colleagues, more recently in the Senate would not, that authorized (back in the late 1930's) 100-percent appropriation upon the part of Congress for all flood control. Prior to that it was a Federal-State relationship where the State had to contribute the land free and clear from all encumbrances and add the expenses which was a deterrent to flood protection and the development of multiple dams.

I am also the original introducer of the bill that is known as the McCormack-Bush bill which gives the leeway, I think, of $354,000 to initiate projects without specific authorization on the part of Congress.

I might also say in connection with these hearings that we have the problem of hurricanes in Massachusetts. Of course, New England is unique from the rest of the country in consideration of water resources, and occupies a unique position. But in relation to hurricanes, we have had some terrific ones; a very severe one in 1955 caused nearly $500 million damage and I think there was the loss of 91 lives.

If it would have gone a few miles north it would have been double that loss. Unfortunately, that was a terrific hurricane. We all know the history of hurricane legislation. We know how for now that 30 percent has to be contributed by local communities.

The CHAIRMAN. May I say something, too?

We in our committee tried awfully hard to get that figure at a less amount but were definitely advised that a bill that had a less amount for local contribution would be vetoed. Your efforts in that regard were in line with those of our committee.

Representative MCCORMACK. The first bill was vetoed.

The CHAIRMAN. Yes.

Representative MCCORMACK. I introduced a bill to try not to depart from the 30-percent local contribution with our recognized inadvisability of that, but to try to enable certain communities which had a fixed percent or more decreased unemployment situation, together with other factors, to get lower interests or have an agreement made on 30 percent where the local communities could assume it more effectively. I had in mind particularly New Bedford, the problem confronting New Bedford also concerns the Narragansett project here.

I call attention to that bill because that might be of interest to you and to your colleagues. It is not a departure from the 30 percent, although I do not believe in the 30 percent personally, but we had to do it. It is not a departure but it enables a relaxation where local communities under certain conditions can make their contribution to these projects which are so needed for their economic life and for their self-preservation.

I appreciate very much your inviting me, at least permitting me to say these few remarks. I am looking forward to cooperating in the House with the recommendations of your committee.

The CHAIRMAN. I want to say this with the form of cooperation with you in the House, we will get along pretty good.

We will be recessed until 12:30.

(Whereupon, at 11:25 a.m., Tuesday, December 8, 1959, the committee recessed to reconvene at 12:30 p.m. the same day.)

AFTERNOON SESSION

Senator Hart (presiding). The committee will be in order.

Senator Moss will be here in a very few minutes but for the convenience of the witnesses I think we should proceed.

There was one witness who indicated it would be very helpful in terms of his travel plans if he could be taken out of order.

If there is no objection and if Mr. Bullock of the New York Farm Bureau is here we would be glad to have Mr. Bullock's statement at this time.

If Mr. Bullock is not here, are Dr. Martin and Dr. Burkhead in attendance yet?

Apparently not.

Is the spokesman for the New England Interstate Water Pollution Control Commission, Mr. Plumb, here?

How about the Massachusetts Farm Bureau?

Mr. RENOUF. Present.

Senator HART. Mr. Renouf.

STATEMENT OF HENRY RENOUF, MASSACHUSETTS FARM BUREAU

Mr. RENOUF. My name is Henry Renouf. I am a farmer in Belchertown, Mass., and am privileged to testify before you in behalf of the following three organizations: Massachusetts Association of Soil Conservation Districts as their president; the Massachusetts Farm Bureau Federation as chairman of their natural resources committee; the Massachusetts Conservation Council as their designated representative.

The so-called "water problem" with which the people of our country are currently wrestling is surely one of the most misunderstood and sometimes even misrepresented problems to come before them. Statements of half truths or statements containing misleading implications tend to create an unrealistic concern and to develop pressures for legislative cures which can cure nothing but peace of mind.

Even one of our revered Massachusetts institutions published the following statement just a few months ago:

> The problem of diminishing water supplies is more critical in the Northeast than anywhere else in the Nation.

Were the phrase "increasing water demands" substituted for "diminishing water supplies" it would be more near the mark and would avoid alarming and misleading many an innocent.

The Northeast faces less of a water shortage in terms of a diminishing supply than the Nation faces a food shortage in terms of agriculture's ability to produce. What it faces is the need for decision,

decision as to how much technology and how much money it is willing and able to devote to having the desired quality and quantity of water available at the desired times and places.

It must realize that water, like food, is essentially a production item, with economics the chief limiting factor. The production of potable water from sea water is already an accomplished fact. The know-how for the elimination of watershed contamination and stream pollution is ours.

We merely face again, as men, the same need for decision that we faced as youths, shivering on the brink of the old swimming hole and encouraged by the cries of our friends, "Come on in; the water's fine."

The role of Congress in the field of water legislation should be primarily to facilitate and assist, controlling only where there is no alternative. Even the establishment of a national water policy should be in terms of broad generalizations. Each area of the country, in fact each specific watershed with its particular ecology, is likely to require its own individual water policy. Congress should primarily see to it that the policies develop with an eye toward the greatest good for the greatest number, that they look toward the future as well as the present, and that they recognize that local problems cannot be entirely isolated from the problems of the Nation as a whole.

Without doing violence to the concept that the right to use water is a property right or that the administration and development of water rights are primarily a State responsibility, Congress can still assure the preservation of wetlands for migratory waterfowl, provide access through or over dams for fish to reach their spawning grounds, gradually eliminate major stream pollution, and provide national parks and seashores for human satisfaction.

Within this framework Congress can perform an enormous service in facilitating water conservation and development toward the furtherance of which I should like to make four specific recommendations.

First, Congress should make possible the establishment of the field stations and laboratories currently being requested by the Agricultural Research Service, including the one suggested for the University of Massachusetts at Amherst. Only through a continuing research program can we hope to develop and maintain a sound water policy.

Second, Congress should further amend Public Law 566, the Small Watershed Act, to liberalize the present cost-benefit ratio method of determining the acceptability of projects. The future social and economic benefits of watershed development cannot be adequately determined by measuring past physical losses and calculating the degree by which future losses would be reduced through engineering techniques.

The flood control aspect of a multipurpose watershed protection project may prove in the long run the least important benefit that a really inclusive project can provide.

Third, Congress should reexamine the purposes for which its appropriation for the Agricultural Conservation Program are expended, and determine to what extent production payments are being made under the euphemism of conservation. It might be possible to shift some of the emphasis from one type of conservation to another and

particularly to water conservation. If such a shift proved feasible a substantially increased appropriation for ACP would seem reasonable.

The beneficial effects of farm ponds, whether for fire protection, recreation, livestock watering or irrigation are too well known to need restatement. They have two additional values which are rarely emphasized and these I would like to call to your attention. One of them is their salutary effect upon the surrounding water table and consequently upon the streamflow out of the watershed. The Soil Conservation Service has supplied me with the following estimates for Massachusetts conditions:

Because pond bottoms are not watertight, seepage into the water table is inevitable, and this, in turn, increases streamflow during drought periods. A one-half inch drop per day per pond is a reasonable estimate, and if 1 percent of a watershed is covered by ponds, then for each 1,000 acres in that watershed streamflow can be expected to increase by approximately 0.5 cubic foot per second, that is, between 4 and 5 gallons. This is sufficient to maintain a respectable trout stream or to compensate for substantial pumping from the water table.

Another benefit of small or so-called farm ponds is their function in flood control. This water they impound is largely surplus water which would have been lost to streams when they least needed it. This function of holding back surplus water can be measurably increased by providing for additional freeboard at the time of pond construction, a practice which might well warrant support through the ACP upon determination of its value to the watershed and in an amount based on some fraction of the cost of existing flood-control projects in the area.

For instance, in western Massachusetts the Knightsville Dam cost initially $77.72 per acre-foot of water storage capacity, and is maintained at an additional annual cost of $22,000 a year.

If the Knightsville flood control function for the Connecticut River watershed could be usefully supplemented by private structures at no maintenance cost to the Government and at an initial subsidy cost of say two-thirds or $50 per acre-foot of capacity, it might prove to be a sound investment in a developing water policy.

Fourth and finally, I cannot overemphasize the advantages of Congress' considering the problems of water conservation from the standpoint of the small watershed and of multipurpose use. The small watershed is the source of our water, the logical geographic unit to be dealt with according to its special physical characteristics and land use patterns. Multipurpose use development, and, of course, fair apportionment of project costs, is the only way to insure against wasted resources and to guarantee to all their share of our tremendous natural bounty.

Senator HART. Thank you very much for your statement, including some specifics. Are there any questions?

Senator MOSS. No. That was a very excellent statement.

Senator HART. Has Mr. Bullock joined us now?

I explained when we opened the hearing that you sought to catch a train. We will have the statement of C. K. Bullock now, speaking for the New York Farm Bureau.

STATEMENT OF C. K. BULLOCK, NEW YORK FARM BUREAU

Mr. BULLOCK. Thank you.

Senator Hart and members of the Senate Select Committee on National Water Resources, it is evident to the New York Farm Bureau that development, conservation, and wise use of our water resources are essential to the future welfare of our State, the State of New York, the Northeast, and the country as a whole. We believe that in the interest of efficiency and economy in the overall development of water resources, there should be a division of responsibility among Federal, State, and local agencies and also private organizations.

It appears that the Federal Government is in the best position to develop, assemble, and make available to the States, basic information in the field of water resource management. Among the items covered by this responsibility should be:

1. Careful climatic study of existing weather information with particular reference to rainfall. Weather records exist for periods of about 100 years in many parts of the country, which could be put into forms for easy summary such as on punchcards for use in tabulating machines.

2. Studies of representative watersheds in various climatic and physiographic—soil, topography, vegetative cover—regions to enable the application of basic information obtained to all watersheds in their future development and management for maximum water yield.

As an example we cite the study made in New Hampshire by the Northeastern Forest Experiment Station and reported in 1959 as Station Paper No. 116. Information obtained in this study can be used to determine water yields in watersheds with similar climatic and physiographic characteristics.

If the Nation's water resources are to be developed at minimum expense it would seem that more studies such as that done in New Hampshire would avoid costly duplicating studies by the several States.

It is good that Federal agencies are studying and reporting on technical problems including weather modification, production of fresh water from salt water, salvage of sewage and industrial waters and the application of nuclear energy, all of which we feel are important in the field of water resources management in New York State and in fact, the entire Northeast.

The search for basic information with nationwide application is a primary responsibility of the Federal Government.

We understand that Congress is considering regional facilities for soil and water research. Research in these fields can be done most effectively and most economically on a regional basis. A facility already exists in the Northeast which with a minimum of capital outlay, could be enlarged to accommodate soil and water research. I refer to the Federal Soil, Plant, and Nutrition Laboratory located at Cornell University. We commend this facility to you and your committee for your consideration.

Another broad area of Federal responsibility in water resource management is in connection with flood control and river regulation. In the development of water resources by a State within its boundaries primarily for local benefit, there are flood control aspects which are

of concern and benefit to the general public. This is particularly true to watersheds involving more than one State. In such instances, funds should be provided permitting the Federal Government to cooperate with the States involved so as to assure the needed flood control in locally constructed and locally managed projects.

Further, we firmly believe that more satisfactory accomplishments can be gained by greater application of upstream flood control measures in the smaller watersheds.

The question of water rights is of great importance in the total field of water resource development. We believe that water rights belong to the people of the State and in resource development the management and allocation of water should for all time remain the responsibility of the people of the State.

We are in accord with the principles of water rights outlined in S. 1416 now before Congress and urge favorable action on this bill.

In the current decade the people of New York have been actively interested in the conservation and development of our water resources.

Through the State legislature they have estimated the future needs of water for various uses, established legal machinery for the development of water resources on a local basis and are continuing broad studies on water resource development. Legislative bodies recently and presently involved include a joint legislative committee on natural resources, a commission on irrigation, a committee on revision of the conservation law and which many of our water laws are a part and the newly created commission on water resources planning. We commend reports of these legislative bodies for your consideration and I am filing copies of some of these reports with you.

Our State legislature at its 1959 session, adopted legislation which was signed by the Governor which among other things, establishes legal machinery and procedures whereby water resources may be developed. This is chapter 843 of the laws of 1959 and a copy of that is included in this packet of material.

Mr. Chairman, we appreciate the efforts of your committee in seeking the best approach to the development and management of our country's water resources.

The New York Farm Bureau also appreciates the opportunity to express its views to you today and pledges its continued support of a vigorous, well-planned water resource development program.

In a supplemental way I would like to read three short paragraphs which I would like to present to your secretary with these legislative reports in which I have included marked pages having to do with things that the citizens of New York are already concerning themselves about in our water resources.

The following will show the interests that our people are taking in water and related problems.

1. In 1951 the New York State Legislature recognized the need for conservation, preservation, and use of the natural resources in the State and established a legislative committee to delve into those problems. The life of this committee has been continued without interruption since that time. Among the important natural resources that have come within the purview of this committee is water.

2. In 1955 a State commission on irrigation was created by the legislature because of the growing importance of irrigation to the agriculture of New York State. During this commission's 4-year life it studied and reported on the needs

of farmers with regard to water for irrigation and existing barriers in obtaining water for that purpose.

3. In 1959 the State legislature combined its water activities into one committee known as the legislative committee on water resources planning. This committee has picked up the ball previously carried by the committee on natural resources and the commission on irrigation.

And the rest of the supplemental statement has to do with marked sections from this report.

Again, let me express our appreciation.

Senator HART. Before you leave, let us thank you for your contribution. The material that you have left will be included in the files of the committee and I will ask the staff director to determine whether the marked material ought to be incorporated in the record at this point.

Mr. BULLOCK. I would not ask that it be incorporated in the record, only for the benefit of the committee itself.

Senator HART. Thank you.

I am sure Senator Moss is glad to know that you endorsed his bill.

Senator Moss. Yes. I was interested in your reference to S. 1416, Mr. Bullock. I do not know whether you would like to elaborate any on that. It has been of great concern to me and something that I have been working on in the Senate at this point.

To what extent has irrigation become of importance to the State of New York?

Mr. BULLOCK. It is of considerable importance in some areas of the State, particularly where the soil type is such that it does not hold large quantities of water, such as on Long Island and in northwestern New York, where the rainfall is the least of any area of the State and the soil type and the other climatic features are excellent for growing vegetables. The potential in northwestern New York is considerable, the potential increase in irrigation, I mean. On Long Island there has been great increases in irrigation of potatoes.

Senator Moss. What would be your source of irrigation water on Long Island?

Mr. BULLOCK. Wells.

Senator Moss. Pumping from wells?

Mr. BULLOCK. That is right. There seems to be an adequate supply up to the present time for that purpose.

Senator Moss. You have not had any intrusion of salinity there?

Mr. BULLOCK. Not yet.

Senator Moss. How about the water table? Does it hold up?

Mr. BULLOCK. The water table seems to be holding up very well. It varies to a degree according to the rainfall during the season. But we have had no serious decline on the eastern end of Long Island on the water table.

Senator Moss. That is very interesting. I know that the Farm Bureau on a national level has been giving us a lot of help on S. 1416. I am hoping we will get it through in this session.

Mr. BULLOCK. Thank you.

Senator HART. Thank you.

Speaking for the Municipal Electric Association of Massachusetts and the Northeastern Rural Electric Cooperatives is Mr. Estey who is accompanied by Mr. Leland Olds.

Would you prefer to wait?

STATEMENT OF LELAND OLDS, REPRESENTING THE MUNICIPAL ELECTRIC ASSOCIATION OF MASSACHUSETTS AND NORTHEASTERN RURAL ELECTRIC COOPERATIVES

Mr. OLDS. Senator, I understand Mr. Estey was here this morning although he did not catch up with me. I have a few words I would like to say, if I may, to add to what I said to you at Augusta on behalf of the Massachusetts Municipal Utilities if that is satisfactory.

Senator HART. Indeed it is.

The chairman of this committee said in introducing Mr. Olds at the hearing in Augusta yesterday that we have the benefit of one of the foremost authorities in America on power matters and water uses in connection with it, a former member of the Federal Power Commission and many other things.

We are glad to have you back.

Mr. OLDS. Thank you very much. I am not going to take any time.

In the first place, I am simply going to state that the substance of what I put in the record in connection with the Augusta hearing was on behalf of the Municipal Association of Electric Utilities in this State as well as on behalf of the Northeastern Rural Electric Cooperatives Association.

I want to call attention, however, to the matter that is of specific interest to the Massachusetts Municipal Association and do it on the basis of this comment.

You may have noted, that in the very able discussions that have gone on before this committee during the last 2 days, of the proposed joint Federal-State approach, for which they are now building support, there has been no suggestion or emphasis on control of streamflow, real conservation of water and of the use of such controlled streamflow for among other things electric power. That has been substantially assumed to be left as I understand the approach, to the private power companies of these Northeastern States.

That is the matter of particular importance to the Massachusetts municipal electric systems. They are concerned with the point which I emphasized yesterday in Augusta—the importance of treating rivers on a multiple-purpose approach in order to get, in the first place conservation storage and then, from their particular point of view the use of conservation storage for among other things the development of electric power as a possible competitive source of power supply, even though it is developed as peak load power for what are termed under Federal power legislation the "preference group of customers," that is, the municipal, public, and cooperative systems.

I would like to submit subsequently for the record, some data in connection with these few remarks I am making here on behalf of the municipal electric systems. In the first place, there is this table showing what the municipal electric systems in Massachusetts have to pay for their power supply.

To the people in many States it might be a rather shocking picture. I note that the first municipal plant on the list is Ashburnham. Its cost of power in 1958 was 1.63 cents a kilowatt-hour. That is wholesale power supply.

I jump down to the middle of the list to Norwood. It has a little lower cost of wholesale power supply, which is 1.465 cents. In other words, approximately 1½ cents per kilowatt-hour.

I go to the last on the list. It is West Boilston municipal plant. Its average cost of wholesale power supply today is 1.69, or roughly 1.7 cents per kilowatt-hour. Now, most of you know, I think, how that compares with rates in States where multiple-purpose river-basin development has been a factor. Rates charges by private companies for this same kind of wholesale power supply such as the Alabama Power Co., 0.665 cents, or about two-thirds of a cent, as against an average cost in Massachusetts for municipal systems of just about 1½ cents.

Similarly, you can shift to the Duke Power Co. in the Carolinas charging 0.742 cents, still less than half the cost which is being paid today for power supply by the municipal electric systems in Massachusetts.

You can go down to the Oklahoma Gas & Electric System—I am sorry that Senator Kerr is not here—his rural electric cooperatives are paying only just over 6 mills for their wholesale power supply. Virginia Electric Power Co., right down there near Washington, D.C., is charging only about 8 mills for its power supply. Their costs are substantially one-half the power costs of the municipal electric systems in Massachusetts where there has been no Federal multiple-purpose river basin program to provide a competitive source of power supply from Federal multiple-purpose projects.

That is the first point.

Senator HART. The record will remain open as we indicated in Augusta to January 15 for the purpose of submission of post-statistics.

Mr. OLDS. Really in response to a question that Senator Kerr asked yesterday, I would like to submit for the record another table, a table showing what residential consumers paid for 250 kilowatt-hours a month use of electric energy to a number of private power systems some of which have been influenced by multiple-purpose river basin programs and some of which have not been influenced.

The table shows clearly that the highest rates paid in the country substantially for that amount of residential electric use appear in connection with the Boston Edison Co., right here in this area; the Central Vermont Public Service Co.; the Worcester County Electric Co. of Massachusetts; the Public Service Co. of New Hampshire; the Narragansett Electric Co. in Rhode Island; the Merrimack-Essex Electric Co., in Massachusetts; the Connecticut Light & Power Co., in Connecticut; and the Central Maine Power Co. serving in the State in which you had your hearing yesterday.

These rates are substantially $2 more per month than rates in areas served by private companies that have been influenced by the multi-purpose Federal power program.

I would like to submit that table subsequently for the record.

Senator HART. Granted.

Mr. OLDS. I made an analysis, which I referred to yesterday, of the power-supply costs of a typical New England company, the New England Electric Power Co., to show that its costs today are approxi-

mately 1.2 cents per kilowatt-hour for transmitted electric energy. That is substantially a high cost when compared, for instance, with the companies of the very progressive American electric power system where the same costs are 7.2 mills, substantially 5 mills less than those of Massachusetts and New England.

However, it can be pointed out that in New England the cost of fuel for the generation of power is substantially higher than in Ohio and in the coal-producing States.

So I have taken the coal costs and modified them (the fuel-generating costs) and modified them to fit the New England situation, and have found that the cost of power, if so modified, could have been in this region substantially between 9 mills and a cent a kilowatt-hour, instead of 1.2 cents with approximately 1.3 cents a kilowatt-hour as the average wholesale charge. I would like to submit that table subsequently for the record.

Senator HART. I would assume, Commissioner, that the table will in footnote form; at least, explain how you have adopted this modification, what the modification reflected is.

Mr. OLDS. In connection with the table, I will submit the precise way that the table is derived, the fixed charges used, and everything of that kind, so you can judge the table.

I simply call these to your attention to indicate why the Massachusetts Association of Municipal Utilities is very concerned with a satisfactory working out of multiple river-basin programs, rather than essentially single-purpose basin programs, in the New England States.

I might also suggest one interesting factor concerning one or two of the municipal plants that is of importance in connection with a full river-basin program. A part of the full program for the Connecticut River in this area is the Enfield Rapids project just above Hartford in the main stream of the Connecticut River. That is important, among other things, because it provides for the development of about 42,000 kilowatts of hydroelectric power in association with a navigation development.

That navigation development will carry 12-foot navigation above Hartford, essentially to Springfield and Holyoke, Mass. In other words, it will open up the possibility of the municipal plants in Chicopee, Mass., and Connecticut or jointly to obtain lower-cost fuel because they will have the advantage of water-borne deliveries of fuel, rather than rail deliveries of fuel.

That, in general, is substantially what I want to say particularly today on behalf of the municipal plants in Massachusetts. And merely add that they would support the general recommendations that I made yesterday for carrying out river-basin programs on a multiple-purpose basis.

Thank you very much.

Senator HART. Thank you very much.

Senator MOSS. That was fine. Thank you, Mr. Olds.

(The tables referred to follow:)

TABLE 1.—*State average bills for 250-kilowatt-hour residential service, Jan. 1, 1959,[1] footnoted to suggest influence of public competition*

[New England-New York area marked *]

Above national average:		Below national average:	
*Vermont	$8.90	Michigan [5]	$7.33
*Massachusetts [2]	8.81	Pennsylvania	7.30
*New Hampshire	8.75	West Virginia	7.25
*Rhode Island	8.74	Missouri [3]	7.24
North Dakota	8.52	Indiana	7.24
South Dakota	8.50	Texas [3]	7.18
*Maine	8.48	Wyoming	7.16
Delaware	8.30	Mississippi [3]	6.98
*New York	8.19	Ohio [3]	6.96
*Connecticut	8.18	Colorado [3]	6.95
Iowa	8.18	Kentucky [4]	6.77
Florida	8.12	North Carolina [4]	6.77
Maryland	8.11	South Carolina [4]	6.77
Oklahoma	8.05	California [4]	6.74
Arkansas	7.89	Nevada [4]	6.73
Minnesota	7.87	Wisconsin [3 5]	6.72
Illinois	7.73	Utah [4]	6.62
Arizona	7.71	Kansas [3]	6.60
New Mexico	7.71	Georgia [6]	6.44
Virginia	7.64	Idaho [6]	6.41
Montana	7.43	Nebraska [7]	6.23
New Jersey	7.40	Alabama [6]	5.42
Louisiana	7.37	Oregon [6]	5.39
		Tennessee [7]	5.01
U.S. average	7.36	Washington [5]	4.52

[1] Source: FPC "Typical Electric Bills, 1959," for cities of 2,500 population or more.
[2] Weighted average for municipal plants, $7.70; for private systems, $8.95.
[3] Slight public competitive influence.
[4] Moderate public competitive influence.
[5] Weighted average for 31 municipal plants, $5.59.
[6] Strong public competitive influence.
[7] Practically all public or cooperative.

TABLE 2.—*How public competition helps consumers served by private power systems, lowest and highest private power company bills for 250 kilowatt-hours home use (1959)*[1]

[Companies in New England-New York area marked *]

Lowest private-company bills:[2]	
Washington Water Power Co.[3]	$4.66
Madison Gas & Electric Co. (Wisconsin)	4.85
Pacific Power & Light Co. (Oregon)[4]	5.00
Kansas Gas & Electric Co.[5]	5.00
Puget Sound Power & Light Co. (Washington)[6]	5.10
Portland General Electric Co. (Oregon)[7]	5.25
Indiana & Michigan Electric Co.[8]	5.40
Alabama Power Co.[9]	5.51
Houston Lighting & Power Co. (Texas)[10]	5.67
Southern Nevada Power Co.[11]	5.70
Union Lighting, Heat & Power Co. (Kentucky)[12]	5.75
Consumers Power Co. (Michigan)[13]	5.80
Kansas Power & Light Co.[14]	5.85
Central Illinois Light Co.[15]	6.10
Georgia Power Co.[16]	6.18
Louisville Gas & Electric Co. (Kentucky)[17]	6.20
Cheyenne Fuel & Power Co. (Wyoming)	6.20
Missouri Public Service Co.[18]	6.28
Ohio Edison Co.[19]	6.30
Duke Power Co. (North and South Carolina)[20]	6.36
Potomac Electric Power Co. (District of Columbia)[21]	6.38
Niagara Mohawk Power Corp.[22]	6.39
Philadelphia Electric Co.	6.48
Wisconsin Electric Power Co.[23]	6.55
Highest private-company bills:[2]	
Kentucky Utilities Co	8.45
Minnesota Power & Light Co.	8.45
*Connecticut Power & Light Co.[24]	8.45
*Blackstone Valley Gas & Electric Co. (Rhode Island)	8.51
*Western Massachusetts Electric Co.[24]	8.52
*Rochester Gas & Electric Co. (New York)	8.53
*Consolidated Edison Co. (New York)	8.61
*Worcester County Electric Co. (Massachusetts)[24]	8.62
Iowa Southern Utilities Co.[25]	8.70
Central Illinois Public Service Co	8.84
*Public Service Co. of New Hampshire	8.85
*Narragansett Electric Co. (Rhode Island)	8.85
*Lynn Gas & Electric Co. (Massachusetts)	8.86
*Brockton Edison Co. (Massachusetts)	8.88
Missouri Power & Light Co.[24]	8.97
*Merrimack-Essex Electric Co. (Massachusetts)[24]	8.99
*Central Hudson Gas & Electric Co. (New York)	9.07
*Orange & Rockland Utilities (New York)[24]	9.19
*Green Mountain Power Co. (Vermont)[26]	9.23
*Hartford Electric Light Co. (Connecticut)[27]	9.30
Iowa Public Service Co.[24]	9.40
*Central Vermont Public Service Co.[28]	9.50
*Boston Edison Co. (Massachusetts)	9.61
Florida Power Corp	9.70

See footnotes on facing page.

[1] Source: Federal Power Commission "Typical Electric Bills, 1959," for cities of 2,500 population or more.

[2] General note: In the great majority of cases the lowest bills charged by private companies can be directly traced to actual or potential public competition, in many cases related to Federal multiple-purpose river-basin hydroelectric power. In almost all cases the highest bills charged by private power companies are located where no such effective public competition has been available. In two cases, however, the high-rate companies are found to charge considerably lower bills where there is public competition.

[3] Bill in Spokane, Wash. Elsewhere $5.01. Spokane rates lower since 1942 battle to keep franchise and prevent public ownership when Grand Coulee power became available.

[4] Charge in competition with Springfield, Oreg., municipal plant; also charges $4.50 in competition with The Dalles Public Utility District. Elsewhere in Oregon charges $5.82 to $5.88. Low rates reflect influence of municipal systems supplemented by Bonneville Power Administration in Pacific Northwest.

[5] Charge in Wichita, Kans.; elsewhere $5.19. Kansas City, public plant, charges $4.95.

[6] Charge in Renton, Wash., between two great municipal plants, Seattle with $4.40 and Takoma with $3.20; elsewhere $5.72. Influence of State's many public-utility districts and Bonneville Power Administration.

[7] Influence of many public systems and Bonneville Power Administration.

[8] Competition with Fort Wayne, Ind., municipal plant with same charge; elsewhere $7.15.

[9] Influence of Tennessee Valley Authority power marketed by municipal systems.

[10] Charge in Houston, Tex. Also charges $6.02 in some communities.

[11] Near Boulder City, Nev., public distribution of Hoover Dam power.

[12] Charge in Covington, Ky.; elsewhere charges $6.80. Low rates due to early public-ownership threat based on Tennessee Valley Authority power to sister company across river in Cincinnati.

[13] Charge in Bay City, Mich., in competition with municipal plant with same charge. Elsewhere charges $6.45. Other municipal plants in market area charge as follows: Holland, $6.12; Lansing, $6.13; Sturgis, $6.23; East Lansing and Grand Haven, $6.33; Coldwater, Hillsdale, and Marshall, $6.45. Detroit Edison Co., without such competition, charges $7.74.

[14] Charge in Topeka, Kans., State capital; elsewhere $7.98–$9.13. Topeka within 50 miles of Kansas City, Kans., municipal plant with $4.95 charge.

[15] Charge in Springfield, Ill., in competition with municipal plant charging $5.70. Elsewhere charges $6.69. Other major companies in State charge $7.59 to $8.84.

[16] Competitive influence of Tennessee Valley Authority and Southeastern Power Administration Federal systems supplying municipal and cooperative systems.

[17] Indirect competitive influence of Tennessee Valley Authority.

[18] Charge in competition with Trenton, Mo., municipal plant with same charge; charges $6.66 in competition with Poplar Bluff municipal plant; elsewhere up to $8.70 with predominant charge of $7.75.

[19] Charge in Akron and Youngstown, Ohio. Other charges up to $7.53.

[20] Competitive influence of South Carolina authorities, Tennessee Valley Authority, and Southeastern Power Administration.

[21] Longtime influence of proposed public development of Potomac River hydro on regulatory procedure.

[22] Charge in Buffalo, Niagara Falls (N.Y.), and vicinity where for years proximity of low rates under public ownership in Ontario, Canada, and Jamestown, N.Y., has been influential. Charge $6.46 in eastern New York cities.

[23] Charge in Milwaukee (Wis.), oldtime Socialist city, and vicinity.

[24] Weighted average. Western Massachusetts charges $8.29 in Springfield, near Chicopee, Holyoke, and Westfield municipal plants, and $8.99 in Pittsfield and elsewhere. Worcester County charges $8.38 in Worcester; elsewhere charges $8.97.

[25] Charge in cities over 10,000; elsewhere $9.15 and $9.70.

[26] Charge in all cities served except Winooski, Vt., where it charges $8.10, matching charge of neighboring Burlington public plant.

[27] Charge in Manchester, Middletown, New London, Stamford, Torrington (Conn.), and several small cities with combined population of 185,000; company charges $8.07 in Hartford and vicinity. Weighted average charge, $8.58.

[28] Charge in Rutland (Vt.), largest city served, and elsewhere except St. Albans, where charge is $7.

TABLE 3.—*Comparative cost of wholesale power supply purchased by municipal and cooperative electric system from private power companies*

	Cents
Supplying company,[2] public competition lacking:	
To Massachusetts municipal systems:[1]	
Boston Edison Co. (5)	1.517
Cambridge Electric Light Co. (1)	1.653
Holyoke Water Power Co. (2)	1.316
Lynn Gas & Electric Co. (1)	1.549
Merrimack-Essex Electric Co. (7)[3]	1.485
Western Massachusetts Electric Co. (3)	1.265
Weymouth Light & Power Co. (2)[4]	1.759
Worcester County Electric Co. (12)[4]	1.600
To New England REA cooperative systems:[1]	
Bangor Hydro-Electric Co. (3)	1.562
Maine Public Service Co. (1)	2.260
Central Vermont Public Service Corp. (2)	1.025
Green Mountain Power Co. (1)	1.186
Public Service Co. of New Hampshire (2)	1.432
To New York REA cooperative systems:[1] New York State Electric & Gas Corp. (5)	1.115
Supplying company,[2] public competition effective:[5]	
To REA cooperative systems:[6]	
Virginia Electric & Power Co. (18)	.811
Carolina Power & Light Co. (19)	.737
Duke Power Co. (North and South Carolina) (15)	.742
Kentucky Utilities Co. (4)	.779
Ohio Power Co. (14)	.760
Georgia Power Co. (39)	.662
Alabama Power Co. (13)	.665
Mississippi Power Co. (6)	.660
Mississippi Power & Light Co. (8)	.515
Louisiana Power & Light Co. (9)	.512
Arkansas Power & Light Co. (10)	.488
Oklahoma Gas & Electric Co. (8)	.605
Public Service of Oklahoma (8)	.659
Southwestern Public Service Co. (17)	.586
Southwestern Gas & Electric Co. (13)	.641
Central Power & Light Co. (10)	.576
Gulf States Utilities Co. (10)	.579

[1] Weighted average charges to municipal and cooperative systems in New England-New York area where competitive influence of public hydro programs has been lacking.

[2] Parentheses contain numbers of public or cooperative systems supplied at weighted average rates shown.

[3] Weymouth Light & Power buys its power supply, in turn, from Boston Edison for an average of 1.451 cents per kilowattt-hour.

[4] Merrimack-Essex Electric and Worcester County Electric buy the bulk of their power supply, in turn, from New England Power Co. for 1.340 cents and 1.328 cents, respectively.

[5] Competitive influence, respectively, of the Southeastern Power Administration, South Carolina Public Service Authority, Greenwood County Electric Power Commission (South Carolina), Tennessee Valley Authority, Southwestern Power Administration, Brazos Conservation and Reclamation District (Texas), and Lower Colorado River Authority (Texas)—all marketing river-basin power.

[6] Weighted average charges to cooperative electric systems by private companies where publicly developed river-basin power has provided direct or indirect competitive influence.

TABLE 4.—*New England Power Co., wholesale power costs and charges, 1958*

Average plant investment, less depreciation:[1]		
Steam production plant		$38,642,912
Hydroproduction plant		78,672,097
Transmission plant		48,738,541
General plant		1,843,771
Fixed charges, including taxes and allowance for general expenses:[2]		
Steam production plant, at 15 percent		5,796,437
Hydroproduction plant, at 14 percent		11,014,094
Transmission plant, at 14 percent		6,823,396
General plant, at 15 percent		276,566
Total		23,910,493
Operating expenses:		
Production, including purchased power		21,940,663
Transmission		3,057,699
Total		48,908,855
Total cost of wholesale power supply:		
Cost per kilowatt-hour sold (4,045,796,000 kw.-hr.)	cents	1.209
Cost per kilowatt-hour, gross less 5 percent losses (4,129,549,000 kw.-hr.)	cents	[3] 1.184
Sales to other electric utilities	kw.-hr.	3,697,341,000
Revenue from sales to other utilities		$47,772,726
Revenue per kilowatt-hour from wholesale business	cents	1.292

[1] Depreciation reserves distributed, at 16.6 percent of investment.
[2] Includes $2,060,000 for general expenses.
[3] Cost of 3,126,245,000 kilowatt-hours generated, less 5 percent transmission losses after deducting purchased power cost, averaged 1.24 cents per kilowatt-hour.

TABLE 5.—*American Electric Power Co., wholesale power costs and charges, 1958*

Average plant investment, less depreciation:[1]		
Steam production plant		$410,026,026
Hydroproduction plant		16,185,466
Transmission plant		241,347,335
General plant		24,951,244
Fixed charges, including taxes and allowance for general expenses:		
Steam production plant, at 15 percent		61,503,904
Steam production plant at 15 percent		61,503,904
Hydroproduction plant, at 14 percent		2,265,965
Transmission plant, at 14 percent		33,788,627
General plant (50 percent, at 15 percent)		1,871,343
Total		99,429,839
Operating expenses:		
Production, including purchased power		64,353,929
Transmission		7,952,708
Total		171,736,476
Total cost of wholesale power supply:		
Cost per kilowatt-hour sold (22,626,394,000 kw.-hr.)[2]	cents	0.759
Cost per kilowatt-hour, gross less 5 percent losses (23,651,154,000 kw.-hr.)	cents	.726
Add fuel cost advantage over New England Co.[3]	do	.217
Estimated cost per kilowatt-hour assuming New England fuel costs	cents	.943

[1] Figures are for combined Appalachian Power, Ohio Power, and Indiana & Michigan Electric Systems, with depreciation at approximately 20 percent.
[2] This reflects distribution as well as transmission losses.
[3] Fuel cost per kilowatt-hour, American Electric Power Co., 0.193 cents; New England Power Co., 0.410 cents.

TABLE 6.—*American Electric Power System-New England Power Co., wholesale power supply costs compared (1958)*

NOTE.—Tables 3 and 4 show New England Power Co.'s average charge of 1.292 cents for wholesale power supply to be 0.566 cent higher than the average American Electric Power System's wholesale power cost, and 0.349 cent higher than that average increased to reflect New England Power Co. fuel costs. The differential is explained by (1) New England Power's excess charge of 0.108 cent per kilowatt-hour over its present costs, including ample return on investment and taxes; (2) New England Power's excess costs of 0.104 cent due to low-capacity factor, which could be improved by lower electric rates throughout the region; and (3) New England Power's remaining excess cost of 0.137 cent, which may be attributed to lack of modern organization of power supply in New England as a whole.

American Electric Power Co. System [1] (see table 5):		
Total cost of production and transmission, including cost of purchased power [2]		$171,736,476
Total energy account, less 5 percent transmission losses [2]	kilowatt-hours	23,651,154,000
Cost per kilowatt-hour	cent	0.726
Approximate capacity factor, allowing 15 percent reserves	percent	69
Cost per kilowatt-hour adjusted to reflect New England fuel costs	cent	0.043
New England Power Co. (see table 4):		
Total cost of production and transmission, including cost of purchased power		$48,908,855
Total energy account, less 5 percent transmission losses	kilowatt-hours	4,129,549,000
Cost per kilowatt-hour	cents	1.184
Approximate capacity factor, allowing 15 percent reserves [3]	percent	52
New England Power Co. costs, adjusted for American Electric Power System capacity factor and fuel costs:		
Total cost adjusted for 69 percent capacity factor operation		$53,852,000
Resulting cost per kilowatt-hour on 60 percent capacity factor basis	cents	1.080
Total cost further adjusted on assumption system could obtain American Electric Power cost [4]		$46,247,465
Resulting cost per kilowatt-hour on 69 percent capacity factor basis [5]	cent	0.928

[1] Combined Appalachian Power-Ohio Power-Indiana & Michigan Electric systems.
[2] Approximately same figures as if credits and debits for purchased and interchanged power were excluded and total energy taken at combined generation less transmission losses.
[3] Capacity factor for own generation; also purchases nearly a billion kilowatt-hours which are included in costs.
[4] Based on 3,505,000,000 kilowatt-hours of generated and purchased power with fuel cost reduced from 0.41 cent to 0.193 cent per kilowatt-hour.
[5] Difference from corresponding American Electric Power figure of 0.943 cent reflects considerable hydroenergy in New England system.

Senator HART. I think the record should show the presence during most of the morning session of the Member of Congress from the Second Massachusetts District, the Honorable Ed Boland. He was forced to leave for Springfield at the noon hour to participate in a school dedication. I think the significance of his presence this morning was augmented by the fact that he is a member of the Public Works Subcommittee of the Appropriations Committee of the House, and I am very glad that he heard what he heard this morning.

Is Mr. Plumb here?

Mr. Plumb is speaking for the New England Interstate Water Pollution Control Commission.

STATEMENT OF GEORGE H. PLUMB, CHAIRMAN, THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION

Mr. PLUMB. Senators Moss and Hart.

My name is George Plumb. I reside in Vermont at Bennington. I am chairman of the New England Interstate Water Pollution Control Commission.

Many of the points covered in this statement have been referred to by a number of the people who spoke here this morning. These points may appear to be reiterated and emphasized at great length but we do say because we feel they have a great deal of importance to the program of pollution abatement in this area.

Today the Nation is water conscious and the New England area is no exception. Interest in the conservation of the water resources of this renowned industrial and recreational region through effective pollution control has become one of paramount public concern. No longer is water pollution considered a necessary evil and its control a costly luxury—for pollution control is now recognized as the easiest and most practical method of conserving and augmenting the water resources of the area.

The crusade to abate water pollution in the area stems from the New England interstate water pollution control compact, a cooperative agreement participated in by the six New England States and New York State in a region which is virtually a network of waters crossing and recrossing State lines and in several instances forming the boundary between two States.

The compact was drafted and approved by an act of Congress in 1947 and subsequently ratified by Connecticut, Massachusetts, Rhode Island, New York, Vermont, New Hampshire, and Maine, in that order. Briefly, it provides for the coordination of the pollution-control programs of the States by the approval of classifications for interstate waters according to their most beneficial uses, followed by the construction of the necessary sewage and industrial waste treatment facilities to meet the approved classifications.

Recognizing the important role which pollution control plays in the conservation of the Nation's water resources and in its social and economic well-being, Congress in 1956 enacted the Federal Water Pollution Control Act—Public Law 660. The primary purpose of this act is to provide financial aid through program grants to State and interstate agencies for expanding their pollution-control activities, and through construction grants to municipalities for the installation of sewage-treatment plants.

Under the provisions of Public Law 660, the program grants will be discontinued at the conclusion of the fiscal year ending June 30, 1961, unless action is taken during the 86th Congress to extend the authorization for this appropriation. The present authorized annual appropriation under Public Law 660 for construction grants is wholly insufficient to provide for the construction of sewage-treatment plants now being planned on the premise that Federal grants will be available.

Public Law 660 declares it to be the policy of Congress to support and aid technical research relating to the prevention and control of water pollution. The current level of research is entirely inadequate

to keep pace with the increasing problems associated with the techniques of waste treatment and disposal.

Congress has aided pollution control by enacting Public Law 560 which is administered by the Housing and Home Finance Agency and provides for loans for advance public works planning. These interest-free loans have accelerated the preparation of plans for sewage-works projects by many communities, in this area.

For many years legislation has been introduced into Congress to encourage the installation of industrial waste treatment facilities by allowing the cost of such works to be amortized at an accelerated rate for income tax purposes. The progress recorded in the abatement of industrial waste pollution is lagging far behind that of sewage treatment.

In summary, the New England Interstate Water Pollution Control Commission and its member States respectfully request that the Senate Select Committee on National Water Resources give careful consideration to the need of the following phases of Federal assistance so vital to the conservation of water resources through the practical and economical medium of pollution control:

1. Continuation of appropriations for program grants to State and interstate agencies under Public Law 660 after fiscal 1961.

2. Increased appropriations for grants to municipalities for the construction of sewage-treatment works under Public Law 660. (See Blatnik bill, H.R. 3610.)

3. Adequate support of technical research to meet the increasing problems of sewage and industrial waste treatment.

4. Continuation of and adequate appropriations for the loan provisions of the Housing and Home Finance Agency advance planning program for community facilities.

5. Aid to industries installing waste-treatment facilities by revising the Internal Revenue Code to permit rapid amoritization of the cost of such non-revenue-producing works.

Now, in conclusion, gentlemen, I would like to leave a copy of the last annual report of the New England Commission, which I think will more fully explain its endeavors and its accomplishments.

Senator HART. Thank you, Mr. Plumb. It will be made a part of the committee's files.

Senator Moss. Mr. Plumb, on the funds under Public Law 660, has the amount available been fully used in Vermont up to this point?

Mr. PLUMB. I believe it has, sir.

Senator Moss. I noticed in your statement you said that the plans were going ahead for sewage facilities that could not be built unless additional funds were appropriated.

Mr. PLUMB. Of course, Vermont's share of Federal funds is not great.

Senator Moss. Yes.

Mr. PLUMB. I know in my own community we received a grant of $250,000 which I believe was almost half of the appropriation for the State for that year.

Senator Moss. Yes.

Mr. PLUMB. Which means of course that other communities cannot share fully as their planning develops or our water conservation may have to allocate these Federal grants at a lesser rate to some of our communities.

Senator Moss. There is no doubt in your mind that this program is necessary and vital to have the Federal Government participate with the communities?

Mr. PLUMB. Senator, without this program we would not have made the advance in Vermont that we have today.

Senator Moss. I am just trying to bring that out because we have something of a problem in giving authorization and appropriation to continue 660 and we are going to need all the support we can get in the Congress. I sit on the Public Works Committee and we have a real battle of course with the Bureau of the Budget and administration on this and we are going to need some help.

Mr. PLUMB. We hope we can help you, sir.

Senator Moss. Thank you.

Senator HART. Speaking for the New England League of Women Voters, Mrs. J. M. Israelsohn.

STATEMENT OF MRS. J. M. ISRAELSOHN, LEAGUE OF WOMEN VOTERS OF MASSACHUSETTS, AND CHAIRMAN OF THE LEAGUE'S NEW ENGLAND WATER RESOURCES AD HOC COMMITTEE

Mrs. ISRAELSOHN. Senator Hart and Senator Moss. I was just told we in New England never pronounce "Moss" properly.

I am Mrs. Jacob M. Israelsohn, of the League of Women Voters of Massachusetts, and chairman of the league's New England water resources ad hoc committee. I am speaking today for the Connecticut, Rhode Island, Massachusetts, New Hampshire, and Vermont Leagues of Women Voters.

Our study in no way implies that we consider ourselves technical experts. We have tried to become reasonably informed citizens. We have tried to develop criteria in three areas—(1) coordinated administration; (2) equitable financing; and (3) regional or river-basin development—so that the planning and development of our water resources, to meet the needs of the country, may be done with optimum efficiency and economy.

From these criteria, league members of the States I represent have reached these broad areas of agreement:

The major issues which the New England States have in common are pollution control, flood control, protection and development of our recreational facilities, and the conservation and development of our water supply.

We agree that possible aids to the solution of these water problems are (1) greater coordination in overall planning of water development; (2) the sharing of costs, in some cases among the several levels of government; and (3) removal of conflicts and inconsistancies in basic policy among the Federal agencies.

We hope that the Federal grant-in-aid for pollution control program will continue, and in fact be expanded to include the additional provisions set forth in the Blatnik bill, H.R. 3610. This program under Public Law 660 is just beginning to gain momentum in New England. The Federal expenditure is relatively small as compared to the entire cost for sewage-treatment plants. The Federal Government program, by making available a low percentage of financial aid, has been successful in developing local responsibility for the solution of

this large problem in New England communities. Because tourism ranks high as one of our income industries, the economy of these States will be hard hit unless pollution is controlled and recreational facilities are expanded.

We firmly believe in approaching flood control from the point of reasonable performance on the part of the States. Flood-plain zoning is a step in the right direction for which local communities and the States must assume more responsibility. This is an area which needs much public education. Our flood problem here is twofold—floods on rivers and floods along the coast, as a result of hurricanes. We have general agreement on the desirability of cost sharing by State and local beneficiaries and on the need for a standard formula to apply to all agencies and on all flood control projects.

While the overall water supply will apparently be sufficient to meet increasing needs there is an immediate necessity for the development of ground-water supply and distribution as well as the acquisition of new reservoir sites. To keep up with the population and industrial growth in the New England area we must be able to insure the availability of adequate water reserves.

There is at present a need for more ground-water surveys. League members generally feel no desire to turn to the Federal Government for a cure-all or the final answer to their local financial problems. They feel that their communities should be ready and willing to pay their way to the best of their ability and to assume a fair share of the cost of any beneficial project. We believe that the Federal Government's financial role should be one of assistance in projects which transcend local boundaries and local ability to carry the whole financial load.

We feel that the problems which exist in New England can best be solved by the cooperative efforts of all the States and the Federal Government. For this reason we are supporting the northeastern water and related land resources compact. This compact has been studied this past year in approximately 175 local communities in New England in which we have a league.

They have indicated strong support of the compact. This compact is an outgrowth of the New England-New York Interagency Committee, known as NENYIAC.

In the light of the NENYIAC group experience—that of Federal and State representatives working closely together, each with equal voice and vote, solving internal problems so that the best program for all would evolve; it is felt that the compact is the most suitable instrument for New England.

We feel that if the Federal and State agencies meet together and look at the region as a whole at the planning stage, better development to benefit the entire area will follow.

The Northeastern Resources Committee which would be established under the compact would bring together in one place, for the use of all, basic data collection and interpretation, provide means by which conflicts may be resolved, and would coordinate the policies, programs, and activities of the Federal, State, and local governments and of private persons or groups in the field of water and related land resources. This compact passed in Connecticut, Rhode Island, Massachusetts, and New Hampshire and will now go before Congress for ratification.

I am submitting with this report a copy of the compact. I am also submitting a copy of the League of Women Voters of Massachusetts Bulletin dated April 1959. This publication carried an article which reached our entire membership giving background information on NENYIAC and the events leading up to the creation of the compact. It also includes an outline of the contents of the compact.

We are also supporting S. 2549, the Resources and Conservation Act of 1960 introduced by Senator Murray of Montana and signed by 30 other Senators, your own name—Senators Moss and Hart—among them. This bill clearly agrees with our position to support coordinated administration. We support this bill because it promises closer liaison between the top levels of the executive and the legislative branches and promotes a more unified outlook on national resource policies as contrasted with the sometimes fragmented viewpoints of the several executive departments and legislative committees. We feel that coordination of the various congressional committees concerned with water resources is a wise and prudent action.

In closing we would like to congratulate the Senate Select Committee on National Water Resources for holding these field hearings to give those of us, governmental and nongovernmental, who are vitally interested and concerned with water problems and their possible solution, an opportunity to be heard.

I also submit with this report separate reports for the States of Vermont and Massachusetts written by the League of Women Voters Water Resource chairman of those States.

Mrs. Elizabeth K. Roper of the League of Women Voters of Connecticut; Mrs. Raymond Gill of the League of Women Voters of Rhode Island; and Mrs. Charles G. Guerriero of the League of Women Voters of New Hampshire are here and would like to submit their written statements for their respective leagues. Mrs. John F. Freeman, I believe, presented the statement for Maine, yesterday at the hearing in Augusta.

Thank you.

(The information referred to follows:)

STATEMENT BY MRS. JACOB M. ISRAELSOHN, WATER RESOURCES CHAIRMAN, LEAGUE OF WOMEN VOTERS OF MASSACHUSETTS

Massachusetts is rated as the third most densely populated State and the sixth smallest in land area in the Nation. It is rich in water and heavily industrialized, demanding larger quantities of fresh water each year. The 81 local Leagues of Women Voters in Massachusetts, with close to 13,000 members, as a result of a 4-year general study of our Nation's water resources recognize that in Massachusetts there are four major areas of concern—water supply, pollution control, expansion of recreational facilities, and flood control.

WATER SUPPLY

It is estimated that within the next 45 years water usage in Massachusetts will double. It is also felt that there is sufficient undeveloped water in the State as a whole to meet these future needs, with a proviso. Sufficient additional storage reservoirs must be created, a system devised to distribute water from areas of surplus to areas of need, and necessary ground water surveys made to determine where the supplies are located. Serious problems will occur in localized areas (in many small communities) where the supply will run out and water will have to be brought in from other areas. Federal-State cooperation in these cases is imperative.

POLLUTION

Although some of our pollution comes from Vermont and New Hampshire, by far the majority comes from within our own borders, and goes on to contribute to the Rhode Island and Connecticut load. Increasing population and industrial expansion add to an already existing problem. Our streams probably carry twice as much industrial waste as municipal waste. These wastes are difficult and costly to treat. Some industries can and are cooperating, but for others the cost would bring about economic disaster. Although our State laws are adequate, the enforcement is understandably a slow process because of the cost of revision of existing industrial facilities. Many communities now faced with inadequate public water supplies may have to turn to rivers which are now polluted. Pollution is the cause of loss of income to some industries. One example is the clam industry. Pollution control would restore many of the clam flats along the Massachusetts coast which have had to close because of contamination. The Federal grant-in-aid program for pollution control, by making available a low percentage of financial aid, has been successful in developing local responsibility for the construction of municipal waste disposal plants in many Massachusetts communities.

RECREATION

Recreation is rated as the third largest dollar producer in Massachusetts. This State must compete with other States for the tourist dollar and this competition is formidable. Potential shoreline and park lands are disappearing at an alarming rate to make way for one type of development or another. Of our 5 million acres we can only offer the public 180,000 acres of outdoor space in State forests, parks, and reservations. Not much more than 25 miles out of its 2,000 miles of tidal shoreline are now offered to the public. A national park on the outer portion of Cape Cod has been proposed. Such a park would draw people from all over the country. This is the kind of project that would have to be federally financed in view of its magnitude. The State and local communities in the area could not financially bear a project of such size. There is feeling that water supply reservoirs should be opened up for fishing and boating. The Massachusetts Water Resources Commission, Army Engineers, U.S. Fish and Wildlife Service, Division of Fisheries and Game, and the Division of Forests and Parks are working together to develop comprehensive recreational plans for a number of flood-control reservoirs. These multipurposes plans will provide fish and wildlife conservation and small pools near the dams for bathing. Pollution abatement, improvement of rivers and harbors, protection of beaches, land acquisition of needed recreational spaces are all increasingly important to provide the means by which we can expand our recreational facilities to satisfy the demand.

FLOOD CONTROL

Massachusetts, in recent years, has been hard hit by floods and tidal waves. In 1955 alone river flooding caused the loss of $134 million in this State. Many long delayed flood-control projects are now underway and many more the being planned. The Army Engineers and the small watershed flood control program (Public Law 566) both have a place in Massachusetts. Flood plain zoning is felt to be an important contribution toward solving the flood control problem. However, the general public, industry, and in fact local communities do not seem to be awarre of the flood damage problems they create by building on the unprotected flood plains and stream banks. There is a big public education job necessary in this concept of flood control.

Our study in no way implies that we consider ourselves technical experts. We have tried to become reasonably informed citizens. From criteria which we have tried to develop the leagues in Massachusetts have reached general agreement on the following: (1) Coordination of local, State, Federal, and private agencies concerned with water resource development are necessary at the early stages of planning. (2) The desirability of cost-sharing among State and local and private beneficiaries. It is well known that New Englanders like to be active rather than passive partners in a project, and are generally willing to pay some share of the cost in order to have their say. (3) Some areas, such as basic data collection, multipurpose projects, and in some cases pollution, are beyond the ability of the State and local governments to finance, and must have Federal assistance.

Our local leagues have indicated that they support the continuation of Public Law 660, the Water Pollution Control Act. The success and need for this

program in Massachusetts is evident by increased construction of municipal sewage treatment plants. Plans have already been submitted for projects in 1960, utilizing much of that year's grant-in-aid. Any cutback in this program will discourage the construction on municipal treatment plants to a far greater extent that it might aid the Federal budget.

Local leagues have also indicated support of the Conservation Act of 1960. We hope this bill will provide the proper liaison between the executive and legislative branches and promote a more unified outlook on national resource policies.

Because so many of our problems involve the cooperative efforts of other States and the Federal Government we feel that a regional organization is necessary. This past year leagues in Massachusetts have studied the northeastern water and related land resources compact and have indicated strong support. Coordination of the various State and Federal agencies at the planning stage we feel will provide better development to benefit not only Massachusetts, but all of New England.

Field hearings such as those this Senate Select Committee on National Water Resources have been conducting represent a highly commendable and painstaking effort to obtain a comprehensive view of the factual conditions and responsible opinions in the various parts of our great country.

STATEMENT BY VIRGINIA M. GUERRIERO, STATE CHAIRMAN, WATER RESOURCES, LEAGUE OF WOMEN VOTERS OF NEW HAMPSHIRE

The League of Women Voters of New Hampshire, comprising 12 local leagues with a total membership of 1,096 women, has been studying the diverse problems associated with water resources development and particularly as they are related to the State of New Hampshire and to the New England region as a whole.

We are aware of the many conflicts and inconsistencies in policies and programs among Federal agencies, and in the relationships among Federal, State, and local agencies. We believe greater coordination can and must be achieved.

Because we believe the proposed Resources and Conservation Act of 1960 is a positive and constructive step in this direction, we support this bill.

We believe that the needs of a particular region can best be met if there is a coordinated effort among Federal, State, local and private interests. Therefore, our membership gave full support to the northeastern water and related land uses compact which provides for such a coordinated effort. Since this compact has now passed four New England State legislatures, we sincerely hope Congress will act to make it effective.

We have concluded from our study of New Hampshire water resources development that there are some problems which can be solved only with the financial help of the Federal Government. Pollution control is an increasingly urgent problem, completely beyond the ability of local authorities to solve. The recently enacted pollution control measure in our New Hampshire State Legislature, which provides State participation in water pollution control costs through financial aid to municipalities, received full support from our membership. It is apparent to us, however, that Federal aid is also necessary to the solution of this problem. We therefore support the grant program as outlined in the water pollution control bill, H.R. 3610, which calls for continuing the 30 percent contribution by the Federal Government to local construction of sewage plants, while increasing the grant money available so that more plants can be constructed more quickly.

The need for adequate ground water surveys is becoming increasingly apparent in New Hampshire. Our industrial growth, particularly in our seacoast and southern regions, is severely hampered by insufficient basic data. Ground water surveys are expansive and completely beyond the ability of the State to assume. We urge that funds be made available to complete adequate ground water surveys.

The League of Women Voters of New Hampshire applauds the establishment of the Senate Select Committee on National Water Resources. It is our earnest hope that the committee's intensive study of our Nation's water problems will result in legislation designed to eliminate the conflicts and inconsistencies now prevalent, to promote overall coordinated planning, and thus provide for the country's constantly increasing water needs.

STATEMENT BY MRS. ELIZABETH K. ROPER, STATE CHAIRMAN, WATER RESOURCES, LEAGUE OF WOMEN VOTERS OF CONNECTICUT

After a general study of our Nation's water resources, the 5,950 members in 54 local Leagues of Women Voters in Connecticut have focused their attention more recently on the Connecticut River Basin and the water problems within the State itself. The most glaring needs appear to be: Additional recreational facilities, the furthering of pollution control, a ground water inventory, and flood-control measures.

RECREATIONAL FACILITIES

Water is Connecticut's most valuable resource, and our salt water shoreline is one of our greatest natural assets. However, the competition for land and water use for various purposes is becoming more and more keen as our population grows. The decentralization of population and industry, coupled with the rapid growth of super highways and increasing need for additional municipal water supplies, has been one of the main factors to cause this competition. The tourist and recreation trade in Connecticut, as in all New England, has become one of the largest sources of income.

Most recreational facilities of New England have been provided by private initiative. The best sites for recreational purposes are intensively used or privately owned. So much so that the general public is now virtually excluded from numerous lakes, long reaches of the streams, and the adjacent natural beach areas. Along the coastline, only two possible available areas, Milford and Groton, have been found, with a total frontage of 3½ miles. They possess some of the desirable features for public seashore, but even one of these suffers from water pollution resulting from industrial waste, sewage, and oil.

However, more than 70 percent of our shoreline has been studied for beach and shore erosion control through a cooperative program between the State and Army Engineers. Beach erosion control programs completed since 1955 or now underway provide for 12 miles of new beaches—enough to accommodate 250,000 more bathers a day at a total cost of more than $4,500,000, shared by the State, the Federal Government, and local municipalities and citizens.

The tremendous increase in the use of boats is a factor which must be given due consideration in the future planning of parks having sound, lake, and river frontage. Development of navigation improvements will provide excellent opportunities for recreational boating on the lower Connecticut River. Effective pollution abatement programs of major importance, coupled with improved low flows resulting from conservation storage, would render the Connecticut River a recreational stream throughout the greater part of its length.

POLLUTION CONTROL

Pollution abatement and the multiple use of dams and reservoirs seem to be the principal means by which the supply of water for recreational uses can be appreciably increased. However, the philosophy of most water supply companies leans toward a single use of reservoir areas, that of supplying potable water. Yet these areas, under proper control, are natural setups for multiple use. In the case of Federal flood control projects, construction should not be initiated on single-purpose projects which would displace potential multiple-purpose development until the multiple-purpose possibilities have been fully explored. Opportunity should also be given to the people of the basin and the region to consider the value and effect of these projects, in the interest of maximum use of the basin's resources, and in the interest of the greatest general welfare.

Although Connecticut has many more streams which are free of pollution than those which are not, serious pollution problems exist in all sections of the State. While the statutes under which the pollution control program has been conducted appear adequate to abate this pollution, and while much work has been done by the State water commission and the State department of health, nevertheless much more pollution abatement work must be done and the staff and budget assigned to this program have been and are inadequate. The record of the cities and towns of Connecticut in combating pollution has been a good one, but the progress in treatment industrial wastes has come much more slowly. Although there is general feeling among league members that local, State, and private entities should share in the cost of pollution abatement projects, some projects are so vast that we feel Federal grants-in-aid are very important in furthering pollution control.

GROUND WATER INVENTORY

With the mounting requirements for water by an expanding industry and a steadily increasing population, Connecticut is faced with the need for up-to-date basic data on ground water sources for supply. It is estimated that about 75 million gallons of water per day are pumped from the ground in Connecticut. However, there is an appalling lack of data which is useful in determining the location of potential sources of ground water of various volumes and qualities for future planning and development purposes in the State.

Within the last few years, an arrangement with the Geological Survey for a moderately detailed investigation of ground water has been instituted. A representative of the Survey is conducting such a study of ground water which it is anticipated will ultimately cover each town in the State. The program has been financed by equal appropriations of State and Federal funds. The 1959 Connecticut Legislature passed a bill which authorizes the State water resources commission to make an inventory of all surface and ground waters of the State. However, no funds were provided to initiate the work. Associated with the ground water study is a requirement passed by the 1955 General Assembly that all well drillers be registered and all well records be filed with the State water resources commission. Local town cooperation is necessary, however, to make this legislation effective.

FLOOD CONTROL

Connecticut's most unique contribution to flood control is its ambitious and comprehensive flood plain zoning program. The 1955 Connecticut Legislature assigned the water resources commission the task of establishing lines along rivers fixing a limit beyond which channelward the owner can erect no building or other obstruction to the free runoff of flood water. The fixing of encroachment lines is a very exacting task, and this work is going on as rapidly as limited personnel will permit.

Many of our towns have built houses and factories on these flood-hazard soils, and in times of high floods such as in 1955, disastrous results follow. This was the case for the Naugatuck, Farmington, Pequabuck, Still River, Salmon Brook, and other flooded rivers and streams.

In the long run, instead of the Federal Government setting up insurance for flooded areas, it might be wiser and certainly cheaper if the Government paid all the costs for moving people and property out of flood-hazard areas to high, drier, and safer ground. Flood insurance not only encourages all to stay, but even favors further development in these areas. The flood plain should be regarded as a risk to be taken with open eyes and not the excuse to charge the damage bill to an already burdened taxpayer. Water makes flood plains and has first right to them.

CONCLUSIONS

The Connecticut League of Women Voters members who have studied the water resources problems have found that the average citizen is uninformed and disinterested. An attitude commonly encountered among residents of flood-devastated areas such as Waterbury is that the 1955 floods were a once-in-a-lifetime occurrence and will never happen again. A most obvious responsibility which rests with public agencies and is not now discharged is that of informing citizens, not only of flood hazards, but water resource problems generally. The successful application of local or regional action depends on public acceptance of both the principle and the costs involved of a project.

In addition, league members stress the value of coordination both as a need in development of the best overall planning and as a means for eliminating overlapping efforts. There is overwhelming agreement that the proposed northeastern water resources and related land compact is the proper machinery to further the development and conservation of New England water resources. The league members feel that this interstate compact will promote more effective coordination and understanding between the party States and the Federal agencies. The Connecticut leagues urge the support of this legislation in the next session of Congress.

STATEMENT BY MRS. RAYMOND GILL, WATER RESOURCE CHAIRMAN, LEAGUE OF WOMEN VOTERS OF RHODE ISLAND

Study by local leagues in Rhode Island points to particular interest in the following water problems:

WATER SUPPLY

While the overall supply will apparently be sufficient to meet increasing needs, there will undoubtedly be a problem of distribution, of the development of ground water supplies, and of acquisition of new reservoir sites. In the last instance, conflicts with recreational interests may have to be resolved. In at least one area possible sources of additional water lie over the State line.

POLLUTION

Due to a concerted effort over the last 10 years, the pollution of Narragansett Bay and its rivers has decreased; however, there are still areas where the problem is serious. One problem here is the distribution of the costs of expensive installations—witness recent activity in opposition to a rate hike secured by the Blackstone Valley Sewer Authority. This system is being financed wholly by users. Local officials said "We are willing to pay what is reasonable * * *" but that they are still getting pollution from upstream, and other communities lower down the river and along the Bay pay nothing while the Blackstone Valley sewage treatment is making their property more valuable. Again there is the problem of cooperation between adjacent States, and we refer to recent newspaper reports such as one reporting discussions between Governors Del Sesto and Furcolo regarding the pollution of Mount Hope Bay, including its large crop of shellfish.

FLOODS AND HURRICANES

Rhode Island has suffered severely from floods and tidal waves. The estimated $100 million dollar shore damage in the 1954 hurricane is only one example. But in addition to the economic dislocation of such disasters, most of us who live here know in very personal terms what it means to suffer such catastrophe.

RECREATION

The recreational facilities and resources of Rhode Island contribute not only to the happiness and well-being of residents and visitors, but to the economic stability of the State. They are assets well worth protecting and developing. Such measures as antipollution projects, the improvement of rivers and harbors the protection of beaches and woodlands, will be increasingly important as time goes on.

We in the League of Women Voters in no sense consider ourselves experts in determining the final answers to problems intricate and often too complicated for a lay person to fully comprehend. However, the broad problems are plain, even to the least scientific mind, and within our membership certain broad areas of understanding and, in some, agreement, are plainly developing. Such a body of informed public opinion, we believe, can be invaluable to those who are charged with the responsibility of charting the future direction of this country in caring for and developing its natural resources.

It has been quite apparent from discussion in local leagues which have considered their own situations that few water problems can be considered from a purely local point of view. A community may clean up its sewage, only to have its portion of the river, or bay, polluted by a neighbor; its water table may be lowered by heavy usage in an adjacent community, or the source of its water may be across city or State boundaries. It may suffer flood damage because of lack of adequate control upstream, or may be struck by occasional catastrophe which weakens it economically and makes necessary protective measures beyond its means to supply.

This points up two of the areas of growing agreement within the Rhode Island leagues: (1) The need for the development of broader areas for planning and administration, and (2) the desirability of sharing the costs, as far as possible, by all beneficiaries.

1. Beyond the community lies the State, and beyond the State the geographic region of which it is a part. A community on its own, or even a single State, can go only so far in developing its resources, solving its problems, and planning for the future. The next logical larger area is the region—here, New England.

One needs only refer to the NENYIAC report for evidence that the water problems of New England cross and recross State lines.

A regional approach such as the proposed northeastern compact is a reasonable development in planning on a broader scale and should minimize many conflicts; it should make possible the coordination of the services of the many Federal and State agencies active in the area. We are convinced that such coordination on a national level is necessary and that it could be developed harmoniously and naturally if it grows up from the regional level.

However, we do believe that any regional arrangement should be completely cooperative, that it should not be weighted in favor of Federal control, or dominance, and that the separate States and/or their communities should have some voice in decisions on projects affecting them.

In many instances, hard-pressed towns and cities need help, from the State and/or from the Federal Government in financing necessary projects beyond their immediate, or future, ability to undertake, such as sewage plants, flood-control projects, beach protection, and river and harbor development.

Much more than the problem of finance enters into this, and the immediate community's well-being is only one factor; its health, its economic life, its recreation facilities, all are of more than immediate concern, for its neighbors are closely involved, and no one village is so set apart that what happens to it does not reflect in some way on the whole of our country. It is short-sighted to neglect the needs of a community because of its own inability to carry the whole load.

Therefore, we believe that the Federal Government should continue to assist in such areas as those mentioned above, but that costs should be reasonably allocated between Federal, State, and local governments, with the use of incentive financing wherever possible.

League members generally feel no desire to turn to the Federal Government as a cure-all or the final answer to their local financial problems. They feel that their communities should be ready and willing to pay their way to the best of their ability, and to assume a fair share of the cost of any beneficial project.

Finally, there appears to be a strong, growing sentiment in our leagues for a centralized authority at the national level to further coordinations of all services and to eliminate duplication, rivalry and diffusion of authority throughout the whole field of water resource conservation and development.

STATEMENT BY LEAGUE OF WOMEN VOTERS OF VERMONT, PHYLLIS BLOOD, CHAIRMAN

The League of Women Voters of Vermont has been studying water resources for the past 4 years. It would like to point out several factors about the situation in Vermont.

Pollution presents the greatest problem. Practically every river, stream, lake, and pond has been polluted, but through the efforts of the Vermont State Water Conservation Board, they are being classified and have already been cleaned up in certain regions.

Lake Champlain is badly polluted. Towns in both New York and Vermont drain into it and the raw sewage from boats increases pollution.

It is felt that Public Law 660 has been a tremendous help to Vermont.

Other problems are ground water, water for recreation, flood control, water rights, soil erosion, watershed protection, and overcutting of forests.

In no other area are the interlocking relationships between soil, forest, and other crops, animal life, and water more evident than here in Vermont.

We in the league are very disturbed over the numerous departments and bureaus that have to do with water, both here and in the whole United States.

When 26 agencies in the United States and 10 alone here in Vermont, as follows: Vermont State Water Conservation Board, Department of Health, Public Service Commission, Fish and Game Service, Department of Forest and Parks, Department of Agriculture, State Recreation Board, State Soil Conservation, University of Vermont and State Agricultural College, Vermont Development Commission, are all connected with water, serious overlapping occurs. This becomes a waste of money, effort, and manpower, and to our minds is the greatest deterrent to the water problem solution here in the United States.

We therefore favor the northeastern water and related land resources compact as being a means of consolidating those agencies and departments here in New England.

We also favor Senator Murray's bill, S. 2549, Resources and Conservation Act of 1960, as it comes nearest to our conception of coordination.

(Enclosed: Conservation Study of Water Resources.)

CONSERVATION: STUDY OF WATER RESOURCES

Water conservation needs for its accomplishment an informed public and adequate laws. Because water resources know no political boundaries, planning must be cooperative on local, State, and Federal levels and with bordering countries like Canada, and must have as a water policy (to quote Dr. Ackerman) "A clear, accepted, reasonably stable body of principles which could be used for the guidance of U.S. water resources development in the public interest."

The whole subject is very complex and the amount of research material available (technical and nontechnical) is overwhelming. Water Resources (National League of Women Voters, September 1956), and On the Water Front (May 1957) provide a starting point toward an understanding of natural resources problems and indicate the role of Federal and State governments in conservation, and the problems which arise if natural resources are to be conserved in the public interest. Leagues in Vermont have reported some books which they found informative and stimulating: F. Osborn, Our Plundered Planet, also his Limits of the Earth; Graham, Natural Principles of Land Use; Parson, Conserving American Resources; U.S. House Document 315, Water Resources Policy; Storer, Web of Life; Krutch, Voice of the Desert; F. Darling, Pelican in the Wilderness; U.S. Department of Agriculture Yearbooks, Trees, 1949 and Water, 1955.

Vermont created its water conservation board in 1947 to protect, regulate and where necessary, control the water resources in the public interest and to promote the general welfare. The duties of this board in brief:

1. Study and investigate the streams, cooperate with Federal agencies in mapping such streams and basins.

2. Cooperate with soil conservation districts in matters affecting soil erosion.

3. Have supervision over matters * * * affecting flood control, channel clearing and river bank protection.

4. Cooperate with duly constituted agencies of the Federal Government, Province of Quebec, adjoining States and States through which water from Vermont streams flow * * * and with the Federal Government on all matters relating to grants in aid to municipalities for construction and operation of sewage treatment facilities.

5. Cooperate with State board of health in matter of stream pollution * * * and make studies * * * of other problems arising from stream pollution and propose remedies to the legislature.

6. Encourage construction of sewage disposal plants by municipalities * * * and other proper methods of sewage and waste disposal in rural and industrial areas.

7. Foster and encourage recreational use of the water of the State * * * cooperate with municipalities and with agencies of the State * * *

8. Act as the Vermont State Water Conservation Board mentioned in the act of Congress "An act authorizing the construction of certain public works on rivers and harbors for flood control and other purposes (December 22, 1944). In this connection the board will cooperate with the Federal Government in the matter of flood control.

9. Exercise and discharge all authority and duties of the board of public works relating to water resources and reservoirs and dams of the State * * *

10. Make and promulgate rules and regulations governing surface levels of natural lakes and ponds which are public water in Vermont.

POLLUTION YARDSTICK

Among the duties and responsibilities of the newly created Vermont State Water Conservation Board was the stream pollution abatement program. This program took form in 1949, Act 148: Control of Pollution of Waters, section 4 says: "The State of Vermont hereby adopts, for the purpose of classifying its waters, the following classes and definitions thereof:

Class A: Suitable for public water supply.

Class B: Suitable for bathing and recreation; irrigation and agricultural uses; fish habitat; aesthetic value; acceptable for water supply with filtration and disinfection.

Class C: Suitable for recreational boating; irrigation of crops not used for consumption without cooking; habitat of wild life * * *

Class D: Suitable for transportation of sewage and industrial wastes without nuisance, and for power, navigation and other industrial uses.

These standards A, B, C, D of suitability for use and standards of quality were adopted by the New England Interstate Water Pollution Control Commission. In 1951 Vermont became a member State. This compact binds the New England States and New York to provide for the abatement of existing pollution and the control of pollution * * * within the compact boundaries. Bennington voters have turned down antipollution plans, but their Walloomsac River is included in the above compact. By 1959 they must find some solution to their problem.

THE PEOPLE DECIDE HOW PURE THEIR WATERS SHOULD BE

Since establishing the A, B, C, D yardstick, the water conservation board has studied stream conditions and now has the data, charts and graphs on about 90 percent of the State's area. This information is the background of pollution studies. Vermont's streams are classified—

1. Facts are gathered to determine the stream's present condition, sources of pollution and desired uses of the water.
2. At the preliminary hearing, the board presents the facts to the local citizens, who are asked to give their opinion as to what should be done.
3. Recommendations for an action program are drawn up and presented for discussion at a second hearing.
4. The Board, aided by an advisory commission which includes citizens of the area, classifies the stream and sets up a time schedule for installing needed waste treatment works. Citizens again express their opinions at a third hearing.

ANTIPOLLUTION AIDS AND GRANTS

Water pollution control is in the best interests of the whole country and the new Federal Water Pollution Control Act, Public Law 660 can benefit Vermont in many ways. Section 6 of the act—"authorizes the Surgeon General to make grants to any State, municipality or intermunicipal or interstate agency for the construction of necessary treatment works to prevent discharge of untreated or inadequately treated sewage or other wastes into any waters."

Under the act $575,325 has been allocated for sewage disposal plants in Vermont (limited to not over 30 percent of the cost and in any case no more than $250,000 for any one project). Vermont bill 126 (no appropriation) allows the water conservation board to provide engineering assistance to aid municipalities in planning adequate sewage disposal systems. The 1957 legislature also passed a million dollar bond issue for sewage treatment plants which provides for the town to pay only half the plant cost (the State will pay 20 percent and Federal Government 30 percent, see above Public Law 660). The towns of Springfield and Burlington are interested in this plan and nearby leagues may have an opportunity to learn how Federal and local groups can work on sewage disposal together and also study details of finance, management and efficiency.

WATERSHED PROTECTION, FLOOD CONTROL, AND SOIL EROSION

Watershed management, flood prevention, soil erosion are constant news topics and make a sizable clipping file, indicating great need and great interest throughout the State. We are hearing about the Otter Creek, Missisquoi Valley, and Black River watersheds; Bennington County, Ottauquechee and West River Valley Soil Erosion districts; flood control in East Creek, Rutland, Waterbury, Barre, Jamaica, North Springfield and Union Village; and many other places all concerned with some form of soil and water conservation.

Public Law 566 (Hope-Aiken bill) explains how to get help under the Watershed Protection and Flood Prevention Act. This act has a new project type approach which requires local people through their local agencies to initiate and participate fully in the development of their watershed projects. Thus, they are local projects with Federal participation rather than Federal projects with local participation. "The practical-sized watershed is one for which the residents are willing to spend time, money, energy and hope because they regard it as their own."

Public Act No. 234 (Vermont Acts 1955), enables our water conservation board and local agencies to cooperate in activities authorized by Public Law 566. The board has prepared a clear and helpful 6 pages of "questions and answers pertaining to the Watershed Protection and Flood Prevention Act as it applies to Vermont." In no other area are the interlocking relationships between soils, forests and other crops, animal life, and water more evident than here. Any league would do well to make a study of a nearby watershed and to report on what is needed to develop a practical, overall, long-term natural resource plan.

FLOOD CONTROL

The proposed dam at North Springfield has made this quote very apropos: "There has been much controversy developed between the groups who favor flood-control measures consisting of land treatment measures and small dams in the headquarters of our streams, and the group supporting flood control through large dams to afford downstream protection. I believe that much of this disagreement came through lack of complete understanding of what the two programs attempt." Background reading might be helpful: L. B. Leopold and T. Maddock, Flood Control Controversy (big dams, little dams, and land management), New York, Ronald Press, 1954.

REGIONAL CONSERVATION ORGANIZATIONS

Regional groups can do much to coordinate interstate conservation studies, arouse public interest, study ways of financing much needed projects, encourage cooperation among the groups which are working for some phase of conservation.

Among these groups are: Connecticut River Watershed Council (headquarters, Greenfield, Mass.), founded in 1952, privately sponsored organization dedicated to development and preservation of the region's natural resources; Vermont Tributary Associations, Black River watershed and West River development.

Connecticut River Valley Flood Control Commission (headquarters, Keene, N.H.), founded in 1953, three commissioners from each of the four States, appointed by Governors of each State—primary objective to administer the Connecticut River Flood Control Compact. Vermont House bills 180 and 210 and 304 (1957) relate to reimbursement of taxes to towns with Federal flood control reservoirs which benefit the States in the Connecticut River watershed.

The Massachusetts Water Resources Commission, dismayed by the magnitude of agencies, but realizing the interlocking character of our natural resources, has suggested a coordination of the activities of existing State agencies in order to insure that all interests may be protected in programs carried out by the agencies; to review existing laws and policies and attempt to formulate a more comprehensive policy. This suggestion might will be a trend.

NOTES

Recommended publications: Natural Resources of Vermont, Their Conservation and Development, published by Vermont Forest and Farmland Foundation; Conservation Adventures with Dick and Debbie, a delightful little book for the eighth grade, published by Vermont's 13 soil conservation districts and other friends (1957)—will be used in the schools; Concepts of Conservation, a guide to discussion, reading lists, published by Conservation Foundation, 30 East 40th Street, New York City, an excellent pamphlet.

An interesting study was started in June 1957 to study the hydrology of small watersheds, instrumenting them with rain gage network, small weather station, and continuously recording stream gage. Data will be collected on this Federal project which will continue for 10 to 15 years. First network will be at Sleepers River watershed near Danville.

The attached chart shows that there are many more phases of water conservation to study—its relationship to the work done by Fish and Game Service; forests and parks; hydroelectric power; recreation. This is very vital to Vermont's economy and tied up with flood control, reservoirs, pollution, forests, etc.

State agencies, boards and commissions concerned with the conservation, development, and control of water resources in Vermont	Vermont State Water Conservation Board	Department of health	Public service commission	Fish and game service	Department forests and parks	Department of agriculture	State recreation board	State soil conservation through soil conservation districts	University of Vermont and State Agricultural College	Vermont Development Commission through State geologist
Basic data:										
1. Field collection	X	X	X	X						X
2. Analysis and interpretation	X	X	X	X						X
Flood control:										
1. Research	X		X							
2. Administration	X		X							
3. Construction and operation	X									
Irrigation: No specific control; not covered by present statutes.										
Water supply:										
1. Administration		X	X							
2. Analysis		X								
Pollution control:										
1. Administration		(1)								
2. Research	X	X								
3. Abatement and enforcement	X	X								
Recreation:										
1. Planning	X			X	X		X			
2. Administration	X			X	X		X			
3. Construction and operation	X			X	X					
Watershed treatment and flood prevention:										
1. Administration	X					X		X	X	
2. Research	X					X		X	X	
3. Construction and operation	X							X		
Water rights: Not controlled by specific agency; determined in courts.										
Water policy studies:										
1. Water law	X									
2. State water plan	X									
Dams or diversion structures:										
1. Administration	X		X							
2. Research	X		X							
Hydroelectric power development:										
1. Administration			X							
2. Research			X							

[1] Cooperate with the Vermont State Water Conservation Board in matters of stream pollution where public health is involved.

Senator HART. Mrs. Israelsohn, thank you very much.

I would ask the representatives of the league of the several States who were identified as being here, to stand. We would not like to test the veracity of the witness, as I am sure they are here.

I know that Senator Kerr would want this point made, that this is the 22d hearing of the committee and at each hearing a spokesman for the League of Women Voters has testified. The testimony has always been to the point and it demonstrates the kind of understanding which you say is necessary, if we are to meet our responsibility to the generation around the corner in terms of water.

You say this is an area which needs much public education. I know of no agency, no institution, no service, that makes a more important contribution to that kind of education than the league.

I came to this committee, unlike Senator Moss who is a water law expert, knowing little more about rivers than I remembered from my geography book. I began my reeducation with your river basin publication and I think there is nothing to equal it.

Mrs. ISRAELSOHN. I think the statement that you made in the Congressional Record in relationship to the Conservation Act of 1960 certainly relays your interest and knowledge in water resources.

Senator HART. Thank you.

Senator Moss. I am sure he has.

As we would say in the Senate, I would like to associate myself with the remarks made by Senator Hart, especially the part he said about me.

I want to tell Mrs. Israelsohn she may pronounce my name any way she likes. A woman as cute as she will get my attention anytime.

Senator HART. I understand that Mr. Foster, for the Connecticut River Watershed Council is here.

Mr. FOSTER. Mr. Chairman, if I may, I would like to ask our former president of the council, Mr. Ward Duffy, to testify in behalf of the council.

Senator HART. Mr. Duffy.

STATEMENT OF WARD DUFFY, EDITOR, THE HARTFORD TIMES, AND A MEMBER OF THE CONNECTICUT STATE WATER RESOURCES COMMISSION

Mr. DUFFY. Thank you, Senator.

I live in Hartford, Conn., where I am the——

Senator HART. Excuse me, Mr. Duffy. If it is easier, by all means, sit down.

Mr. DUFFY. I am the editor of the Hartford Times; I am a member of the State water resources commission; and I am a former president of the Connecticut River Watershed Council.

I am appearing here today and reading this statement at the request of Dr. Joseph G. Davidson, a former vice president of the Union Carbide Corp. and now the president of the Connecticut River Watershed Council.

Dr. Davidson regrets his inability to be here today. He had to go to Texas on a trip.

The Connecticut River Watershed Council is very pleased to have this opportunity to appear before your committee in the interest of

the various water resource activities of the Connecticut River Valley.

In view of some remarks that have been made during the day here, I might call attention of the committee specifically to page 4 of this statement, where there is a reference to one of the small watershed projects that I know some of you are interested in.

I also call your attention to a number of quotations from the New England-New York Interagency Committee report on which we too have leaned quite heavily.

In summary—and the summary is contained on page 8 of this report—I would like to say that the Connecticut River Watershed Council is presenting this statement to the Senate select committee in order to supply you with certain information regarding the water resources of the Connecticut River watershed and to indicate the manner in which water resource problems here are being identified, programed, and resolved.

From earliest colonal days the river has been important to industry as a source of power and processed water; today it is one of the most completely developed power streams in the United States, and the source of water supply for one of this Nation's great concentrations of modern industry.

Commercial navigation on the river, which was important a hundred years ago, is negligible today except in the tidal sections of the river below Hartford, Conn. Recreational navigation is of increasing importance, as well as general recreational use of the lakes, ponds, streams, and adjoining lands in this most picturesque valley.

We recognize that this area is blessed with an abundance of natural high-quality water, which with reasonable local care should meet foreseeable future needs. At the present time less than 6 percent of the available runoff is withdrawn for consumptive uses. Occasional local deficiencies can and should be corrected by local action.

Municipal and industrial pollution have impaired to some extent the usefulness of the waters of the Connecticut River watershed, but through local initiative under State laws supplemented by the New England interstate water pollution control compact and with certain Federal assistance, good progress is being made in pollution abatement, although much remains to be done before adequate levels of purity are obtained.

Flood control is being accomplished through a combination of local flood-protection works at damage centers and moderate-sized storage dams fitted onto tributary streams. The local flood-control plan, which is nearing 50 percent completion, is being constructed by the U.S. Army Engineers in accordance with the interstate compact setting up the Connecticut River Valley Flood Control Commission.

Siltation is a minor problem in the valley. With 67 percent of the watershed covered by forests and with the comparatively even distribution of rainfall, siltation behind the dams on the river has not been a problem as it has in many other sections of the country.

There is current progress in the establishment of the Northeastern Resources Committee for overall coordination, planning, and conservation of the water and related land resources of the six-State region, largely by local action.

We recognize the progressive need for more streamflow regulation, as well as for development of more water-based recreation, and for improved fish and wildlife resources.

The Connecticut River Watershed Council, a private, nonprofit watershed organization, will continue to take an active part in encouraging and promoting various water resource activities in conformity with the needs of the area.

Recommendations: The Connecticut River Watershed Council respectfully urges that your honorable committee can foster closer coordination between Federal, State, and local municipal and industrial agencies that are concerned with the conservation and constructive use—including recreational uses—of our natural resources.

To this end, we suggest complete cooperation with the New England Interstate Water Pollution Control Commission, and a substantial increase in allotments to the several States, particularly those with heavy population density, for their work in pollution abatement.

We heartily endorse the interstate-compact idea in general. It is an effective technique, compatible with sound public policy and the principles of local responsibility which this council honors

We also recommend continued and adequate support of flood control projects such as are now underway in the upper reaches of the Connecticut Valley, and along several tributaries, under the able supervision of the U.S. Army Corps of Engineers.

In conformity with our belief in the interstate-compact idea, we also endorse the Northeastern Resources Committee. As this agency develops its program, we trust it will have the favorable consideration of your committee.

I would like, if I may, to lay into the record a copy of "Water, Fuel and Energy in New England," a report of the committee of New England of the National Planning Association.

Senator HART. It will be included in the files of the committee.

Mr. DUFFY. That is what I should say.

Senator HART. And the statement, Mr. Duffy, that you have filed with us will be included in full in the record.

(The prepared statement referred to follows:)

STATEMENT OF WARD DUFFY, EDITOR, HARTFORD TIMES, AND MEMBER, CONNECTICUT RIVER WATERSHED COUNCIL, INC.

Mr. Chairman, I am Ward Duffy, editor of the Hartford Times, a member of the Connecticut State Water Resources Commission, and a former president of the Connecticut River Watershed Council. I am appearing here at the request of Dr. Joseph G. Davidson, a former vice president of the Union Carbide Corp. and president of the watershed council. Dr. Davidson regrets his inability to be here today.

The Connecticut River Watershed Council is very pleased to have this opportunity to appear before your committee in the interest of the various water resource activities of the Connecticut River Valley.

I. ORGANIZATION

The Connecticut River Watershed Council is a private, nonprofit, nonpolitical, locally financed, educational organization devoted to the judicious conservation, development, and use of the natural resources of the Connecticut Valley. It was incorporated in Massachusetts in 1952 and maintains an office at 497 Main Street, Greenfield, Mass. It is a regional organization operating on a watershed basis. Council membership from the four Valley States of New Hampshire, Vermont, Massachusetts, and Connecticut represents many interests including industrial, utility, commercial, banking, publishing, educational, recreational, agricultural, civic, and individual.

II. DESCRIPTION OF VALLEY

The Connecticut River is the largest river system in New England, being some 407 miles in length, having a drainage area of 11,265 square miles, and a total drop of 2,600 feet from its source in northern New Hampshire to sea level at Long Island Sound. It is generally typical of the major New England watersheds, being densely populated and intensively developed in its lower reaches, but thinly populated and much more rural in character throughout the headwater areas of both the main river and its tributaries. The population of the valley which was 1,530,000 in 1950, is showing substantial growth, especially rapid in the lower half of the valley.

III. INDUSTRIAL DEVELOPMENT OF THE VALLEY

From early days, the river has been extensively used for various industrial purposes, the earliest dam having been built in 1637 to operate a gristmill on Mill Brook at Wethersfield, Conn. Many dams were built in the late 1700's and early 1800's for navigation and log-driving purposes, while the most historic waterpower dam and industrial canal system was built at Holyoke, Mass., in 1849 and is still in active use.

Since the early 1900's many of the earlier waterpower and storage installations have been developed. These, together with many modern hydroelectric installations on both the main river and its tributaries, comprise a hydroelectric development in excess of 700,000 kilowatts, making the Connecticut River one of the hardest working river systems in the country.

IV. NAVIGATION

The river was widely used for navigation before the advent of modern railroads and highways. Navigation still remains of considerable importance in the tidal sections of the river between Long Island Sound and Hartford, Conn.

The river is navigable to Hartford for vessels drawing 15 feet or less and to Holyoke, Mass., for pleasure craft. In 1957 a total of 2,806,000 tons was transported in vessels and barges on the river below Hartford. Of this tonnage, 2,471,000 was petroleum products and 250,000 was coal. Perhaps we should point out here that a sizable proportion of our oil supply comes into the valley through a pipeline from Providence serving both the Springfield and Hartford areas.

V. RECREATION

The numerous lakes and ponds, including natural bodies of water as well as those created for power and other purposes, comprise a recreational resource of great attraction to both local residents and the extensive tourist and summer population. The Connecticut River watershed contains nearly 900 lakes and ponds larger than 5 acres in area having a combined water-surface area of more than 140 square miles. The river itself with its meandering, picturesque channel, comprises several hundred miles of relatively undeveloped recreational resources. Thus, the area contains great potential for water-based recreation. The New England-New York Interagency Committee (NENYIAC) report states that an estimated $90 million was spent by 2,500,000 visitors annually for outdoor nonurban recreation. These statistics are as of 1952. There has been a phenomenal increase in both recreational expenditures and the number of visitors in this valley during the past 7 years. The Connecticut River Watershed Council is actively identified with the planning and development of the recreational potential of the Connecticut Valley.

VI. FLOOD CONTROL

The Connecticut River Valley has been subjected to extensive damages from major floods, particularly the historical floods of November 1927, March 1936, September 1938, and August 1955.

To facilitate the solution of interstate problems connected with flood control, the Connecticut River Valley Flood Control Commission, consisting of representatives from the four States of the basin, was established in 1953, by compact agreement between the four States of Vermont, New Hampshire, Massachusetts, and Connecticut and was approved by Congress. This commission maintains an office with a full-time manager at Keene, N.H., and is a very active agency.

The flood-control plan of the basin as administered by the U.S. Army Corps of Engineers contains some 21 flood-control reservoirs and numerous local protection works. Good progress is being made in the execution of this plan, including the completion of 7 tributary flood-control dams and 10 local protection works with 4 more such dams presently under construction. There remains much to be done to alleviate the heavy flood damages that recur at unpredictable intervals. Because of the concentrated population and extensive cultural development in the valleys of this watershed and because of the restrictive topography, the flood-control plan is based on the construction of moderate-size dams. These structures are being fitted into the tributary streams helping to hold flooding to a minimum.

Noteworthy among this tributary work is the project now being pushed by the Hartford Flood Control Commission on both the North and South Branches of the Park River. This project is under the control of the U.S. Department of Agriculture in cooperation with several State and local agencies under authorization of Public Act 566.

The Connecticut River Watershed Council has been a stanch supporter of this type of coordinated flood-control program which is specifically designed to meet the physical requirements and social needs of the valley.

Until 1956, the Connecticut Valley was without an adequate flood-warning system. The council was largely responsible for initiating the first steps toward an effective flood-warning system for the valley. In this it received heartiest cooperation from Federal, State, and local agencies. The U.S. Weather Bureau now has a modern flood forecasting and warning center located at Bradley Field, Windsor Locks, Conn.

VII. WATER SUPPLY

Water needs for domestic, municipal, industrial, recreational, and other purposes are being met through local governmental and private efforts. Quoting from a report by the Committee of New England of the National Planning Association published in 1954, copy of which is attached for the files of your committee: "Plentiful supplies of high-quality water are an important industrial asset to New England, and long-range planning of municipal supplies has put most New England cities and towns in an enviable position to meet their future water needs. Substantial precipitation, normally well distributed throughout the year, has minimized the need for agricultural irrigation. While there are occasional local inadequacies of water supply, they can and should be corrected by local action."

Also on this subject of water supply, the report of the New England-New York Inter-Agency Committee in Senate Document No. 14, 85th Congress, 1st session, has this to say: "A surplus of surface water (water from lakes and streams) will be available nearly everywhere in the New England-New York region for domestic and industrial water supply for at least the next 50 years, on the basis of foreseeable needs. This surplus is a valuable asset that could be attractive to new industries, especially those having large water demands. However, water-use competition and pollution adversely affecting water use may result in water shortages in limited areas."

With respect to the Connecticut River basin, the New England-New York Inter-Agency Committee report further states: "Public water systems and industry will have ample supplies of water for at least 50 years except in the New Britain-Bristol-Plymouth, Conn., area. If adequate ground water cannot be developed in this area, consideration should be given to cooperative developments of the available water resources in adjacent watersheds."

While the withdrawals of water from the Connecticut River for industrial, municipal, agricultural, and power uses are substantial, we would like to call the attention of your committee to the fact that in the use of various published records on water use the total of these withdrawals appears to exceed the total available supply. Actually most of these withdrawals are nonconsumptive and the water is returned to the river for use over and over again. For example, New England as a whole withdraws only 5.8 percent of its runoff for municipal, industrial, rural, and irrigational use; some of this returns to the river. This means that over 94 percent of the runoff of the watershed actually reaches the sea.

VIII. POLLUTION

Water pollution is a serious problem throughout much of the Connecticut River watershed. All four of the Valley States have laws in effect that are gener-

ally adeuqate to control water pollution, and in addition these States are signatory members of the New England Interstate Water Pollution Control Commission, a compact established in 1947 for the control and coordination of antipollution works and stream classification. While there has been decided progress of late in pollution abatement in many parts of the Connecticut River system, much more improvement is needed before its waters can achieve adequate levels of purity. In this work the Connecticut River Watershed Council expects to continue to play an important role in encouraging and promoting satisfactory solutions to the problems involved. To make these solutions effective, a favorable public opinion is essential. It is here that the Connecticut River Watershed Council can render valuable service in stimulating community support for pollution-abatement programs.

IX. STORAGE AND STREAMFLOW REGULATION

According to the published records of the U.S. Geological Survey, the flow of the Connecticut River is influenced by more than 2 million acre-feet of storage contained in 23 non-flood-control reservoirs. While most of these reservoirs are operated for specific purposes such as municipal water supply and power, they do contribute an appreciable incidental benefit to both flood control and to streamflow regulation. There is a recognizable need for further streamflow regulation, particularly in augmenting the low natural flows of the river with resulting widespread benefits to recreation, fish and wildlife, agriculture, water supply, and industry.

X. FOREST COVER

About 67 percent of the Connecticut River watershed is covered by forests, about 23 percent is farmland, and the remaining 10 percent is occupied by urban areas, roads, lakes, and rivers. While diversified industry is the major source of income in the Connecticut River Valley agriculture remains an important activity in this basin. Dairy products, tobacco, and poultry products are the leading agricultural income producers.

Because of the sandy soil texture, the large percentage of the area is woodland, the winter snow cover, and the even distribution of rainfall, the soils of the Connecticut River Valley are not as subject to erosion as those of many other parts of the country, and siltation behind dams on the river has not been a problem.

XI. AGRICULTURE

Agriculture in the Connecticut Valley represents one of this Nation's major assets. Although our greatest and newest growth is along industrial and commercial lines, agriculture is still a prime factor in New England life. A Connecticut survey in 1954 shows that the value of farm products sold in the Connecticut Valley section of that State alone amounted to some $57 million.

Almost every phase of conservation and either the use or abuse of our natural resources is of significance to farmers and their families. Soil conservation in the Connecticut Valley is a matter of special importance. The valley in Massachusetts and Connecticut presents an area of some 60 miles where riverbank erosion is of immediate concern. We call the attention of your committee to this problem. We direct your attention particularly to the South Windsor section, some 5 miles north of Hartford. Here hundreds of acres of valuable soil have been lost entirely and the river downstream has suffered considerable silting. South Windsor is by no means the only area of bank erosion but it is one where this sort of damage has been permitted to go unchecked far too long.

XII. WATER RESOURCE DATA

The present program of stream gaging and underground water investigations by the U.S. Geological Survey and State governments should be maintained at a rate that will provide necessary basic data for the orderly conservation and development of the water resources of the valley. In this connection the council feels that the U.S. Geological Survey is doing admirable work.

XIII. INTERSTATE COMPACTS

The New England States have often turned to the interstate compact as a vehicle for dealing with water and related land resource problems of a regional nature. Prominent examples include the New England interstate water pollu-

tion control compact, the Connecticut River Valley flood control compact, the Merrimack River flood control compact, the Thames River flood control compact, the northeastern interstate forest-fire protection compact, the Atlantic States marine fisheries compact, and the current progress in the establishment of the Northeastern Resources Committee compact. The latter is for purposes of obtaining more effective coordination, planning, and conservation of the region's water and related land resources as originally inventoried by the New England-New York Inter-Agency Committee.

Senator HART. I have had an opportunity to thumb through it as you have been giving us the highlights.

Mr. DUFFY. Yes, sir.

Senator HART. It is interesting and it is a good demonstration of the role that a voluntary association of interested institutions and citizens can contribute to this very difficult business.

Mr. DUFFY. Thank you, sir.

May I also place in your files a copy, or three copies, of an atlas of the Connecticut River Valley, which is quite an attractive compilation of maps dealing with almost every phase of public interest in this valley—recreation, the waterflow, agricultural advantages, the flow of the streams themselves, the industrial developments on the valley. It is this sort of thing.

Senator HART. The committee will be glad to have it.

Mr. DUFFY. I am sure it will be of great interest to the committee.

Senator HART. May I ask if you know whether this operation on the Park River, whether there is anything actually on the ground yet or not, as to the watershed?

Mr. DUFFY. There are two branches.

Senator HART. North and south branches of the park?

Mr. DUFFY. Yes. On the north branch they are virtually ready to begin physical operations. The agreements are through and I do not think there is any further hitch in it. Mr. Wise will probably know if there are any further hurdles. I do not think so.

That is not true on the south branch. On the south branch we are now in the process of forming community committees. For instance, I am on one in West Hartford. My home is in West Hartford. I work in Hartford. The other communities that are affected by that branch are forming advisory committees and really the purpose of those committees is to create favorable public opinion in the towns, so that we are not going to have one community as a standout blocking and holding up the whole project.

Senator HART. I have a hunch if the editors of more influential newspapers would associate themselves with those committees we would have more of these in being.

Mr. DUFFY. In that respect, Senator, on the Connecticut River Watershed Council, we have enlisted—in fact, the previous president was an editor—I am an editor and was president—and we have newspaper support up and down our valley. You are quite right about it. In each of the New England States that the Connecticut flows through we have newspaper support. I am positive you are right.

Thank you very much, Senator.

Senator HART. Thank you.

Is Dr. Martin here?

We have what might be described as a change of pace here. The Maxwell School at Syracuse, as I hope our witness will develop, was

the technical source that prepared perhaps the most elaborate river-basin study that America has seen, the Delaware River Basin study.

This committee met in Philadelphia and took some testimony but did not have the benefit of the background that I know Dr. Martin, of Syracuse University, can give us. We will be very glad to have it and appreciate your coming, Doctor.

STATEMENT OF DR. ROSCOE MARTIN, MAXWELL SCHOOL, SYRACUSE UNIVERSITY, SYRACUSE, N.Y.

Dr. MARTIN. Thank you, Mr. Chairman.

Professors are trained to stand for 50 minutes. But may I sit?

Senator HART. Yes.

Dr. MARTIN. Thank you.

Senator HART. Even freshmen Senators are able to go longer than that.

Dr. MARTIN. We are limited to 50 minutes by the gong.

Mr. Chairman, my name is Roscoe C. Martin. I am a professor of political science at Syracuse University. I appear here today representing a research team of four individuals who have just completed a substantial study of the problem of the administration of the water resources of a river basin with particular reference to the Delaware Valley.

Our study arose from sponsorship by the Governors of the four Basin States and the mayors of the two largest cities, New York and Philadelphia. It had the benefit of a substantial grant from the Ford Foundation under which the study was pursued.

We completed this study on September 1, and submitted our final report to our sponsors.

I shall speak today on the basis of experience gained from that report and shall address my remarks primarily to the administrative aspects of river-basin development.

The study of the Syracuse research group related primarily to the Delaware Valley, as I have indicated. Nevertheless, we had occasion to examine the whole of American experience in river-basin administration with some care. Consequently, while my immediate past experience relates primarily to the Delaware, I believe that the information compiled and digested by my colleagues and me will be generally relevant to the eastern river valleys.

These valleys we identified as those of the Connecticut, the Hudson, the Delaware, the Susquehanna, and the Potomac.

There are several characteristics of these valleys which need to be taken into account before addressing the problem of administration there.

I wish to develop this line of thinking because eastern river valleys are quite different, as you, of course, know, from many river valleys which have had considerable experience in administration. Different, for example, from the valley of the Tennessee, from the valley of the Missouri, and from the valley of the Colorado.

So I should like to say just a few words about the features which distinguish eastern river valleys.

In the first place, all are highly urbanized and, in the second place, all are highly industrialized. Flowing from these two facts are two corollary facts which we ought to note:

First, water problems in these valleys are very highly complex. Second, water-resource development in these valleys is very expensive, because of the high degree of settlement and the high degree of industrialization which characterizes the valleys.

Further adding to the complexity of these eastern river basins is the fact that all except the Hudson are interstate streams and so are beyond the purview of any governmental agency excepting the U.S. Government. That is a strong statement. I will come back to it presently.

An alleviating factor as a fourth feature which I should like to mention here is found in the fact that there is comparatively lots of water in these eastern river basins.

This would seem to suggest that the problem in the East, as perhaps nowhere else in the country, is one of water-resource management. The complexity of the problem, the interstate character of the streams, the fact that there is enough water if it is properly managed—these facts suggest the importance of water management, particularly in the eastern basins.

Water management may be said in simplest terms to involve, first, what may be called a temporal aspect in the sense that on the typical river there is too much water at some times and too little at other times and, secondly, again in simplest terms, a spatial aspect in that there is plenty of water in some places and not enough water in other places.

As a friend of mine likes to say, the problem of water management is one of from now to then and from here to there, the problem of husbanding your water when it falls and then transporting it to where you need it; but storing and distributing water is not enough.

That is the from-now-to-then and from-here-to-there part of it. But that is not nearly the whole story, because this water can be used for a great many purposes along the way.

In other words, water management, intelligent, broad-gaged water management, calls also for multiple-purpose development, for multiple use of the water resources.

I should like to suggest this as a basic consideration in river-basin administration. The need for multiple uses of the water, uses for navigation, for water supply, for recreation, for flood control—there are a half dozen significant uses to which water should be put and indeed must be put if we are to use it intelligently.

I suggest that this problem is basinwide in character. It concerns the whole of any particular river basin. This would seem not to require much development and so I shall leave this point.

I am suggesting that local developments must be in accord with an overall plan and program. There must be a plan for the whole of the river basin.

So we come to the need for river-basin development, development of all the water resources of a particular basin. In this enterprise,

which is vast and complicated and extremely costly, private enterprise has an important role to play but so also does government. It is to the role of government in river-basin administration that I should like to speak.

Let me make it clear that I do not mean to ignore or minimize the role of private enterprise, but I am addressing my remarks to government.

At the present time in any particular river valley there will be as many as 12 to 20 Federal agencies involved in this or that aspect of water resource administration. One thinks first and immediately of the Corps of Engineers, the Bureau of Reclamation, more important in the west than in the east, nevertheless, has some role to play in eastern river valleys.

So also does the Public Health Service and the Weather Bureau and the Geological Survey and the Federal Communications Commission, and so on, to the number, as I have suggested, of 12 to 15, sometimes more, in any particular basin.

There will also be in any particular basin normally a number of States. In the case of the Delaware, four States are involved. There will be sometimes literally hundreds of cities. There will be hundreds of special agencies, special districts, special authorities. In the case of the Delaware again there are something of the order of 1,000 units of government.

Now, to suggest that these public agencies do not approach the problem of total water resource administration in an integrated, unified, coordinated way is in nowise to condemn or criticize them. I should like to make this point with whatever vigor I possess because I shall adopt a tone henceforward which may seem critical of existing agencies. I do not mean it to be.

The Corps of Engineers is an extraordinarily competent agency to do what it was created to do, but it was not created to develop a comprehensive plan for water resource administration. This is not its legal mission. This is not the legal mission of any other public agency in any eastern river basin, Federal, State, or local. So let us pass by the question of competence and get on with the question of whether any particular agency or whether all in the aggregate achieve the general purpose of comprehensive river-basin development. The answer is quite a simple one—they do not.

Here in particular the sum of the parts is nothing like as great as the whole. The whole problem of river-basin administration includes aspects which are not, and by their nature cannot, be dealt with by existing agencies. It would be quite beyond the legal scope of action of any existing agency to do this job. It is beyond the legal scope of all put together to do the job, because the individual bits of the job have not been defined in terms of pieces of the total job.

The total job is one of managing the water resources of a river basin. We have reached the conclusion in our study of this problem that river-basin development requires a special organization for the development to the fullest extent of water resources.

Let us see what agencies are available for this task. The Federal Government has an important stake in this problem; so, in the second instance, do the States. I pass by the localities for the moment to examine the manifold interests of Federal Government and the States.

The States have a device by which they can get at the problem of interstate administration. It has been referred to by previous speakers here—the interstate compact.

In briefest terms, and without developing the thought at any length, no compact agency has yet addressed itself to ongoing multiform administrative problems. A compact agency can achieve many things. It is good for negotiation among the States. It is good for shaking down to a consensus among the States. But where executive action is required, where a decision is required to be made and then carried into effect, experience has proved the interstate compact agency to be cumbersome and ineffective. This is a harsh indictment, but I am speaking from the record. The interstate compacts, let me reiterate, have done good work at times and for limited purposes. But the States have yet to demonstrate their capacity for developing a plan for managing a river basin. I should like to see them develop this capacity and shall propose a scheme presently by which it might be done. But let us first examine the Federal Government interest in this problem.

I would like to say, first, that I regard the Federal Government as my government. It is not a government by or for somebody else. It is a government run by and for my neighbors and me. It is a responsible government. I suspect it might be developed that the Federal Government is as responsible as any unit of government there is, but I shan't take that one on at this point.

I shall say just that I am not afraid to see the Federal Government do the kind of work which I think it can do best. It has a stake in river-basin development, a stake which is of interest and concern to every citizen in the United States. I do not wish, therefore, to write the Federal Government off in this field any more than I wish to write the States off. Let us examine the question of how the two might be brought together in the most intelligent way, in the development of an administrative organization for river-basin administration.

There are two or three devices which come immediately to mind, and the first is a Federal statute which might set up a corporation or some other kind of organization for river-basin administration in any particular river valley. Now, we have such a corporation in the agency of the Tennessee Valley Authority. But we do not have to follow without deviation the example of the Tennessee Valley Authority. For example, we recommended for the Delaware Valley that there be established as a first-phase agency a Delaware River Agency for Water, which would be a Federal agency which would have a five-man Commission, on which, however, the four States would be represented. The President would appoint all five members. He would appoint the first as a representative of the Government of the United States. He would appoint the other four from panels nominated by the four Governors. This offers a possible variation which we think worthy of exploration. It has not been tried before. There is some hint of this in the new commissions established in the southeast and southwest in 1958.

Then we have the second-phase recommendation for the Delaware, an organization to take the place of the first-phase Delaware River Agency for Water. This we called a Delaware River Commission, and it would be established by joint Federal-interstate compact. The concept of a Federal-interstate compact is not new but so far as I know there has not been a working model of such a compact. We proposed a compact entered into jointly by the four States and the Federal Government, each of which would be represented on the board of managers. This would be a board of five again, one from each State appointed by the Governor of that State and a representative from the Federal Government appointed by the President.

There are certain obstacles in the way of the adoption of either of these propositions. One would involve the limitation of the authority of the President to appoint. This is an issue which would have to be resolved so that the President's power to appoint the members of the agency of the first phase would not be limited to one person, but would extend to a panel nominated by the Governors. Another concerns the transfer of rights and powers long held by the States to the basin agency. I may say that unless there is general willingness to collaborate in the resolution of river-basin organizational problems then, of course, these problems will not be resolved.

The States by tradition and by long practice have certain powers basic to water resource administration, they are close to the people, the people are used to seeing them operate. The Federal Government has an unquestioned interest in developing a particular river basin and it also has the funds by which to undertake such development. The States simply are not going to put up the money to build the dams, or to erect the other structures necessary for full river-basin development.

An interesting event occurred over in New York just a month ago. There was a popular vote on whether the last remaining important canal system owned by a State should be retained for continued management by the State of New York. The people of that State authorized the legislature to take steps to turn this canal system, based on the old Erie, over to the Federal Government. I do not know what this means in particular except that the richest, or if there are Californians present, the second richest, State in the Union finds it unpalatable or uneconomic or inexpedient or undesirable to continue in the management of an enterprise which the State has run for 125 or more years.

It costs the State $13 million a year to run the Erie Canal. This is why it wishes to transfer that responsibility to the Federal Government. This is a compelling argument.

I feel the Federal Government's interest and its financial capacity must be recognized through acceptance of Federal participation in river-basin development, not sole participation but joint participation. The (Kestnbaum) Commission on Intergovernmental Relations popularized a very good phrase—cooperative federalism. Here I think is a place to bring cooperative federalism into operation, but it has to be cooperative. It has to recognize the interest of both the States and the Federal Government.

We of the Syracuse research group believe that this can be done. We are confident that the way to approach an intelligent resolution of river-basin problems is through basinwide development. We see

no satisfactory way to achieve this excepting through the joint efforts of the U.S. Government and the States.

Thank you, sir.

Senator HART. Professor, thank you very much. Your statement in full will be incorporated in the record.

(The statement referred to follows:)

A STATEMENT OF GUTHRIE S. BIRKHEAD, JESSE V. BURKHEAD, ROSCOE C. MARTIN, AND FRANK J. MUNGER, OF THE FACULTY OF THE MAXWELL GRADUATE SCHOOL, SYRACUSE UNIVERSITY

This statement represents a consensus of the thinking of the staff members of the Syracuse University Delaware Valley project. This project was sponsored by the Water Research Foundation for the Delaware River Basin under a grant from the Ford Foundation. It was the responsibility of the staff to examine present and emerging water resource problems; to examine the nature of existing governmental programs, Federal, State, and local; and to propose an administrative structure and financial policy for the development of Delaware River Basin water resources. In the course of the research it was necessary to explore administrative and financial experience in other river basins throughout the country, and to arrive at some understanding of the water problems of eastern river valleys other than the Delaware. A report has been transmitted to the project's sponsors. Publication is planned for the spring of 1960.

The present statement covers in brief fashion four major topics. The first consists of some general remarks about water-resource problems in eastern valleys. The second describes some characteristics of existing programs and agencies for water development. The third examines alternative administrative structures with specific reference to the Delaware, and the fourth analyzes some of the financial problems necessarily involved.

The nature of the water problem in eastern river valleys

In the river valleys along the eastern seaboard—and here we are thinking primarily of five: The Connecticut, the Hudson, the Delaware, the Susquehanna, and the Potomac—water-resource development is important, but it is not the key to the whole of the economic future of the region. This is not an underdeveloped region comparable with the Tennessee Valley in the early 1930's where water-resource development could unleash a major potential to induce rapid increases in industrialization and improvements in the standard of living. Eastern river valleys are industrialized, urbanized complexes, and the goal here is to assure that water resources are adequate to meet the needs of expanding industrial growth and growing population.

Water programs in eastern valleys will be necessarily different in emphasis than in other parts of the country. The development of hydroelectric power, for example, is of much less significance here than in the West. Not only is the undeveloped hydro potential limited, but that potential is a very small part of total electric power requirements for the immediate future. On the other hand, programs for pollution abatement in this densely settled area are of great importance, as are adequate supplies of industrial and municipal water. Similarly, water-resource programs must be developed in such a way as to meet the increasing demands for recreation facilities. Emphasis on these aspects of water development can be expected to make an important contribution to a generalized improvement in standards of economic welfare in the eastern valleys.

There are other significant characteristics of eastern river valley development. One of these is that the land areas needed for reservoirs and for recreation areas will be difficult and costly to secure. All along the eastern seaboard open spaces are rapidly being preempted for private economic development. There is an obvious need for immediate steps to impose controls, such as zoning, to protect prospective reservoir areas, and to plan future recreation sites. Only in this way can the costs of future development be held down. Such measures, however, are very difficult to bring about since there is at present no generalized public awareness of their necessity. Another characteristic of eastern water resources is that the valleys have no high degree of hydrologic unity. The water needs of one valley can sometimes be met by major diversions from another

valley but a few miles away. In this situation there is little applicability of the notion that the waters of a river "belong to" the people inhabiting its valley. Water-resource development programs must be planned on a scale that will very often embrace more than one valley.

The study of water-resource problems in the Delaware Valley revealed clearly the difficulties of identifying specific water requirements with assurance for several decades ahead. Water requirements are changing rapidly, and the relative emphasis on specific programs (pollution abatement, flood control, recreation) changes from year to year. The dynamics of this situation are well illustrated by the case of industrial and municipal water requirements. All are familiar with the dire forecasts that the well is running dry, and with projections of water needs showing a dismal picture of eastern metropolitan areas brought to economic decline by water shortages. There are, of course, critical situations in specific local areas, but generalized shortages do not now exist and there is no reason to expect them until sometime after 1980 and probably not until after the turn of the century.

The technology of industrial and municipal water supply is subject to rapid change. We may well be on the edge of a major breakthrough in desalinization or weather modification that would substantially alter the state of existing and prospective water supplies. Less dramatically, more widespread adoption of known techniques, such as recirculation systems or cooling towers, by industrial firms would greatly reduce gross water requirements. The use of sewage effluent for some industrial water purposes is also feasible and could be extended. Industrial self-supplied water users along the eastern seaboard now take up to 80 percent of total water withdrawals in some areas. As water becomes more scarce and more valuable, it is reasonable to expect that new water-saving devices will be more widely employed. It is obvious that many variables may affect the need for construction of major river control reservoirs for industrial and municipal purposes.

The general technological uncertainty about the future of industrial and municipal water requirements is compounded by a surprising lack of reliable data on existing water-use patterns. Very little is known about the relationship between ground and surface water availability in eastern valleys. Information on domestic water use in major metropolitan areas is fragmentary and incomplete. Almost nothing is known about costs and requirements for industrial users, or about the extent to which they employ recirculation devices. The first need, so far as industrial and municipal water is concerned, is for more and sounder data.

What has been said so far emphasizes the significance of administration. There appears to be plenty of water throughout the East to meet all reasonable requirements for the foreseeable future. This will prove true, however, only if the generous water resource is properly managed. The wanton disregard of prudent policies, the willful neglect of sound organization, the wasteful practices of the past can be continued only at the region's peril. It is past time for systematic consideration of the problem of water management in the East.

Characteristics of existing programs and agencies

At the present time water resource development in the river valleys of the East is characterized by a fragmentation of programs among Federal, State, and local agencies. Such minimum efforts as have been made toward the coordination of programs have occurred principally through the instrumentality of interstate commissions but, although these commissions have scored some successes in the field of pollution control, they have failed completely to control the development of eastern waters in accordance with the generally accepted standards of comprehensive development and multipurpose use.

Federal programs and agencies.—The principal Federal programs operative in eastern river valleys are administered by the Departments of Defense; Health, Education, and Welfare; Interior; and Agriculture, although the Federal Power Commission, the Commerce and Treasury Departments, and the Office of Civil and Defense Mobilization have water-related functions.

In magnitude of expenditures the most important water-development programs conducted in this area are those of the U.S. Army Corps of Engineers. In the construction of flood control reservoirs and other facilities, in the improvement

of navigation channels, and in port development the Army Engineers have played a major role in eastern water resource development, as elsewhere in the country. Other Federal programs related to flood control are the joint flood-warning programs of the Geological Survey within the Department of the Interior and the Weather Bureau within Commerce, and the flood disaster relief programs participated in by the Office of Civil and Defense Mobilization and the U.S. Coast Guard. The Coast Guard likewise has responsibilities over navigation that affect shipping within the area.

An increasingly important Federal water program in the Eastern States is found in the pollution-control work of the Public Health Service (Department of Health, Education, and Welfare). This encompasses programs of data collection, research, grants-in-aid to State and local pollution-control programs, and an enforcement power over the pollution of interstate streams never yet employed. The Public Health Service has likewise assumed responsibility for Federal research in the expanding problem area of water supply, a field in which the Corps of Engineers has also been empowered to act through title III of the Omnibus Rivers and Harbors and Flood Control Act of 1958, which authorizes inclusion of storage for present and anticipated water-supply needs in Federal reservoirs constructed by the corps.

Although the jurisdiction of the Department of the Interior over water-resource development is less broad in the East than in the western reclamation States, that Department has responsibility for Federal recreation programs through its National Park and Fish and Wildlife Services; while the general authority of the Secretary of Interior over the marketing of hydroelectric power, conferred by the Flood Control Act of 1944, would extend also to power generated at Federal dams in the Northeast. The regulatory power of the Federal Power Commission over private power production on interstate streams, as well as its authorization to investigate potential power sites, are also relevant in the latter connection.

In addition to these Federal water programs, the part played by the Department of Agriculture has been enhanced by the expansion (in Public Law 566) of its authority over small watershed programs. The numerous watershed associations in these eastern river valleys testify to the substantial popular interest in the program. Without by any means exhausting the list of Federal programs, final mention will be made of the data-gathering programs of the Geological Survey (Department of the Interior) and of the Coast and Geodetic Survey (Commerce).

State and local programs.—The principal State and local water-development programs in the East, as in most other parts of the country, have been concerned with water supply and with sewage and waste disposal. These are not, however, the only water-related activities pursued in these States. The Power Authority of the State of New York, with installations at Niagara Falls and on the St. Lawrence, is one of the major hydroelectric power producers on the continent. The State of Pennsylvania, through its department of forests and waters, carries on an extensive flood-control program, involving not only channel clearing and straightening but also the construction of flood-detention reservoirs of substantial size. The Water Resources Board of New Hampshire has provided on contract for augmentation of low flows for industrial purposes on rivers within the State, while two river-regulating districts within New York State provide the same service. And the State of New York operates the last major non-Federal navigation channel in the Nation in the New York State barge canal, although a constitutional amendment was approved by the voters of the State in the last (November) election to permit its transfer to the Federal Government.

Two of the Eastern States have established far-reaching water-supply programs. Massachusetts, through its metropolitan district commission, provides a water source for the Boston metropolitan area, operating what is sometimes described as the largest water-supply reservoir in the world, Quabbin. The State of New Jersey, acting through its department of conservation and economic development, now supplies water for municipal and industrial purposes to central New Jersey and is in the process of constructing reservoirs to supply water also to the metropolitan northeastern section of the State. Elsewhere water-supply and sewage-disposal systems are still in the hands of local governments. The largest of these is the Board of Water Supply of the City of New York, which

operates an extensive system of water-supply reservoirs encompassing substantial parts of both the Delaware and Hudson Valleys.

These constitute only the major developmental programs of the State and local governments; numerous other water-related activities could be cited, concerned with port development, the regulation of navigation, flood warning, water-based recreation, protection of fish and wildlife, soil conservation, data collection, and the like.

Attempts at coordination.—Even a cursory description makes it apparent that numerous Federal, State, and local agencies are engaged in carrying on programs related to the use of water. It is equally obvious that enormous possibilities exist for wasteful duplication and conflict among these programs, unless adequate coordination is effected. For reasons discussed elsewhere, the State does not provide a satisfactory basis for the comprehensive coordination of water-resource programs in the East; yet the plain fact is that effective coordination has not yet been achieved even within the State, to say nothing of the interstate program integration that is called for. In most of these States, it is true, an effort has been made to bring together programs related to natural resources in a single department, called variously the department of conservation, the department of forests and waters, or whatever. It would be safe to assert, however, that only in New Jersey, if fully there, has effective departmental control been established over the several loosely grouped programs. In some States not even the attempt has been made and each water-related program has been lodged in a separate agency, each individually and variously responsible to Governor, legislature, and the people.

On the river-basin level principal reliance has been placed upon the interstate commission as the mechanism for program coordination. Such commissions have been created by compact for New England and for the Potomac, and by parallel State legislation for the Delaware. No similar action has been taken for the Susquehanna, while the Hudson-Mohawk River is in a practical sense an intrastate stream. It may be noted, however, that New York State has established no means for coordinating responsibilities for the latter, which are parceled out among the usual miscellany of Federal, State, and municipal agencies. Federal interagency committees have been created at times for study purposes—the Delaware Survey Coordinating Committees and the New England-New York Inter-Agency Committee (NENYIAC) are the principal examples—but no attempt has been made to employ them as continuing agencies for the coordination of Federal and/or State water programs.

One major problem in the use of interstate commissions for purposes of coordination lies in the difficulties of bringing the affected Federal agencies within their folds. Although the northeastern compact represents a present experiment with Federal-interstate cooperation, the commissions on the Delaware and on the Potomac have existed apart from such major Federal agencies as the Corps of Engineers. A second major defect has lain in the simple fact that these interstate commissions have never coordinated; Incodel and Incopot on the Delaware and Potomac, respectively, have in practice operated as pollution-control agencies, in which field they have achieved some good results. Their preoccupation leaves them largely indistinguishable—save for their narrower powers—from the interstate sanitation commission at the mouth of the Hudson, which is strictly a pollution-control agency.

The principal result of the failure to secure coordination of the various Federal, State, and local water agencies has been neglect of comprehensive planning, wasteful duplication of activities, and failure to maximize multipurpose values from individual projects. To cite specific instances, New York City has proceeded to construct a tremendously expensive water-supply system without taking into consideration the hydroelectric potentials, flood-control benefits, or recreational values accruing from its reservoirs. Although in the operation of its reservoirs the Metropolitan District Commission of Massachusetts attempts to accomplish the multiple objectives of flood control, low-flow augmentation, and power generation, the fact that the system was not planned for such multipurpose use limits the effectiveness of even the best intentioned operating schedule. In the past the Delaware has been developed in much the same way—one set of reservoirs for flood control, a separate program for water supply, a minimum development of hydro power. With a major construction program now in prospect for the Delaware Basin, and presently perhaps for

other valleys as well, a serious danger exists that, in the absence of some coordinating agency, future development will proceed in the same disastrous fashion.

Alternative administrative structures

Administrative structure is of course an important determinant of the continuing effectiveness of any organization's programs. Formal structure can help in maintaining democratic control over the policies and behavior of any organization. And within that organization structural details have a direct bearing on the responsibility and efficiency of management. None of these points would seem to need much argument.

That structural details have been so often emphasized in the perennial debate about water-resources management, however, has both its fortunate and unfortunate aspects. For purposes of public discussion of the issues, it has been a happy circumstance that virtually every man feels himself qualified to discuss points of structure. Everyone is an expert when, for example, the Tennessee Valley Authority is mentioned. It goes without saying that such discussions of structure often are uninformed and highly emotional. They fail to keep in focus the simple truth that organization is but one of several determinants of governmental or administrative success. So arguments about form or structure may ignore or in some cases may consciously conceal the disagreements about substance that lie beneath the surface. "States' rights" too often has been a shield for the position of interest groups who wish to keep programs where they can exert dominant influence over them. And, finally, there are many aspects of structure which are not understood and about which, therefore, generalizations can be based only on ignorance.

The Syracuse University Delaware Valley project found abundant evidence that there are two principal kinds of needs in that valley today, needs that will probably become more and more pressing over the next decades. First is the need for performance of several central water functions now either ignored or ineffectively administered: (1) Research on water resources for the whole basin; (2) planning for the basin and closely neighboring areas; (3) representation of basin interests as a whole and public education as to the meaning and importance of water-resource problems; (4) operation and maintenance of the water-resource structures that are sure to be built in the coming years, for all the purposes those structures can properly be made to serve—flood control, water supply, power, navigation, recreation, fish and wildlife, conservation, among others; (5) quality control; and (6) withdrawal and diversion controls. Secondly, and of equal importance, is the pressing need for such a central agency to coordinate and bring order out of the conglomeration of agencies and programs at all governmental levels existing in this basin today.

What kinds of organizational structures might perform these functions? What do we know positively about structure that has some meaning for doing these things in the Delaware? What can be said about the Delaware probably can be said to greater or lesser degree about other similar rivers in the Northeast—the Connecticut, Hudson, Susquehanna, and Potomac.

Compact agency.—A central agency to plan comprehensive water development for a given major valley or to set up a multiple-purpose agency for water management in such a valley has never been established by interstate compact. Efforts to do so were frustrated in the Delaware in 1953, were abandoned by the Missouri Basin Governors in 1955, and were unsuccessful in other cases.

On the other hand, some parts of the above-mentioned functions have been performed under compact agreement. Water-pollution control is the responsibility of the Interstate Sanitation Commission, the Ohio River Valley Water Sanitation Commission, and the Klamath River Basin Compact Commission. There are other such water-pollution agencies, but only these three have the power to enforce their decisions about pollution. The new Tennessee River Basin Water Pollution Commission is also endowed with power to enforce its orders like the three named above.[1]

Among the Eastern States a few other compacts have made water-resources arrangements. For example, the 1953 Connecticut River flood-control compact, the 1957 Merrimack River flood-control compact, and the 1958 Thames River flood-control compact have been the means by which New England States have come to agreement about what dams the Corps of Engineers may construct in

[1] 72 Stat. 823, 1958.

that part of the world and about how the States will reimburse each other for damages that those dams will cause on arable lands.

In the West the compacts that have been signed in recent years on rivers like the Canadian, the Sabine, the Klamath, and the Bear aim principally at providing for the equitable use and distribution of water resources in those basins. Each compact carefully spells out the terms of interstate water allocation and provides a framework for settling future disputes.

It is important to notice that, although few significant functions have been granted to interstate organizations by these compacts, the increasing importance of the Federal Government and its role in water-resources development more and more is being recognized by them. The New England compacts have been instrumental in setting up arrangements whereby the Corps of Engineers, a Federal agency, can exercise its functions in that region. The western compacts have uniformly provided for Federal representatives as nonvoting chairmen on the commissions thereby created. In the case of one of these western compacts, that on the upper Colorado, the Federal commissioner not only is chairman but is entitled to vote. All of these compacts, then, have had the primary purpose of "shaking loose" the Federal agencies and allowing the States to give some assistance to them in carrying out their highly important functions. The national agencies have the money to build structures that the States are unable or unwilling to finance. The Congress provides a forum where the serious issues of water-resource developments can be examined from time to time. These compacts constitute strong evidence that the leadership of the National Government in the water-resources field is little contested by States today.

One lesson, and an important one, emerging from this history is that any compact providing for the performance of positive water functions, whether in the East or the West, must openly recognize the primacy of the National Government in the water-resources field. There is already a regular procedure by which Federal representatives may participate in compact negotiations.[2] Several different Federal agencies, for example, the Public Health Service and the Fish and Wildlife Service, today already work closely with compact organizations. The upper Colorado River compact affords substantial evidence that a Federal representative may participate and vote in compact-agency deliberations.

The exact extent to which such a Federal representative may participate, however, remains a matter of question. Thus far, the Upper Colorado River Compact Commission seems to have operated by consensus, and it has not gone so far as to attempt to commit the Federal Government to specific courses of action without previous consultation and permission. The position of a Federal representative on an interstate-compact agency remains largely a matter of speculation. How far could he commit his Government? Obviously he could not allocate Federal funds without prior authority, nor could he commit Congress or the President beyond the present moment in any kind of matter. Presumably a Federal representative on an interstate-compact commission could not be outvoted where the actions of Federal agencies are concerned. The sovereign character of the National Government would always be an overriding fact in his participation in compact negotiations.

These kinds of problems were discussed in the negotiations of the Missouri Basin Survey Commission and more recently have been the subject of conversations in the meetings of the Northeastern Resources Committee and in discussions by their representatives before a subcommittee of the Inter-Agency Commission on Water Resources. The point is that there is wide leeway for discussion and good reason for exploration of the problems surrounding Federal participation in an interstate-compact agency. There is ample room here for fresh thinking about the Federal system. The challenge is that of finding a formula recognizing the sovereignty of the National Government but permitting closer State-Federal cooperation on crucial water-resource issues.

The compact remains the most acceptable vehicle for State participation in the management of interstate water. One may speculate as to reasons why it has not been used effectively thus far. First, its critics fear that the compact agency will lead to little or no action. The States apparently are not willing or able,

[2] U.S. Bureau of the Budget, "Guide to Federal Participation in Interstate Compact Negotiations" (Washington, Jan. 3, 1956, duplicated).

either individually or in concert, to put up the capital that big basin-development programs require. The conservative tendencies of State government in the resources field may well be magnified by the compact route. The Federal Government alone seems capable of providing the administrative know-how and the large amounts of money that are necessary. Second, ambitious programs already are operating in this field, under Corps or other Federal agency direction. The States are understandably reluctant to attempt to replace these programs. Third, State officials usually will not engage in cooperation in the field of water unless the allocation of water is settled at the outset. At the same time many officials understand the strategic error involved in dividing water precisely among States, for future developments may be seriously and adversely affected thereby. Furthermore a workable formula for such a division is often impossible of adoption. Finally, uncertainty as to just how much water is available often sharpens the difficulties of making specific allocations.

If the interstate compact is to be made a truly effective instrument, the National Government must play a greater part than it has in the past. This conclusion emerges clearly from an examination of recent compact experience. If this kind of corrective factor could be applied to the compact device, it might become the instrument for creation of an agency to perform the positive functions listed above.

Federal law as a basis of interstate basin administration.—The persuasive rationale for vesting a new basin water program in an existing agency of the National Government is so well known that it needs no extensive discussion here. Less commonly is it pointed out that there are grave risks in such a course of action. The National Government is generally organized along functional lines for water-resources purposes, hence no single agency is in a position to operate a multiple-purpose program. Further, new ideas may be smothered by the ongoing policies, attitudes, and workways of an old department. Professional groups ordinarily dominate an existing organization—and a comprehensive program may well be out of place in the hands of flood-control experts, navigation engineers, soil conservationists, and the like. Budget limits usually are hard and fast in an old, existing agency, and adequate appropriations for new programs may not be attainable. Private interest groups may well be ensconced in an existing department, and new policies may therefore be viewed with suspicion or hostility.

Furthermore, a decision to place a new water program for an interstate river somewhere in the established framework of Federal administration is most puzzling to put into practice. Water is admittedly not a clear-cut organizing idea, a fact reflected by the dispersion of responsibility for water programs among national agencies. Despite the recurrent calls for mending this situation, by two Hoover Commissions and half a dozen other recent study groups, the dispersion continues. In view of all of these difficulties, a case can perhaps be made that the Corps of Engineers should be recognized as the central agency for long-term development of water resources in eastern river basins. Yet there are insurmountable difficulties in that course. The Corps would find it exceedingly difficult to prosecute balanced, multiple-purpose programs, in the face of its long commitment to and emphasis on flood control and navigation. In fact, the point has been impressively made by Arthur A. Maass and Albert L. Sturm, among many students of these problems, that the corps should have no civil functions at all.[2] Their argument is built partly upon the location of civil activities in a military department, partly upon specific policies and engineering practices of the Corps which they consider unwise, partly upon the traditional influence of nongovernmental interests in this agency's work, and partly on the anomalous organizational situation examined just above. So universal is the agreement among students of public administration on the limitations of the Corps, indeed, that placing a new basin program in the hands of that agency simply cannot be justified for any reasons other than those of expediency.

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[2] Arthur A. Maass, *Muddy Waters: The Army Engineers and the Nation's Rivers* (Cambridge, Mass., 1951), and Albert L. Sturm, "Civil Functions of the Corps of Engineers—Relation to Military Mission," Commission on Organization of the Executive Branch of the Government, Task Force Report on Water Resources and Power (Washington, 1955), vol. 3, pp. 1473–1578.

If one of the regular departments in the National Government cannot be found to do this job, what about an interagency committee representing several departments? The question warrants consideration. Although there are numerous examples of this device in recent years, no such committee has been based upon solid legal foundation and none has performed the kinds of positive functions that are demanded for eastern river basins. The interagency committees on the Columbia and the Missouri and in the Pacific Southwest stemmed from the old Federal Interagency River Basin Committee and from State desires for participation in Federal agency deliberations. NENYIAC, AWRIAC, and the current Delaware committee grew from congressional committees or Presidential directives. This kind of interagency committee has thus far been a temporary study device and has ordinarily disbanded when its report was finished. The two new interagency study committees for the Southeastern States and for Texas, created in 1958, are of this variety.

Some of these interagency committees have served moderately well for communication and discussion of problems across agency lines. One is hard put, however, to find any example of substantial coordination among the Federal agencies or among those agencies and the States; while the utility of the interagency committee for producing comprehensive, multiple-purpose studies or plans or for operating control systems has received no demonstration at all. Until members of such committees find ways of surmounting agency loyalties and professional barriers and attaining better common understanding, the interagency committee is bound to remain a weak substitute for a more action-oriented mechanism.

If unified water-resources administration is to come about in river basins at an early date, it will probably be by passage of a congressional statute. If a means of focussing attention and efforts, valley-by-valley, is to be attained, if the obvious strengths of the Federal statute route are to be exploited, the fragmented character of the Federal administrative establishment must be surmounted. Without violating the integrity of existing water-resource agencies in the Federal Government, a new agency can be established for providing the needed functions in a given river valley. There are many precedents for such a course of action, among them the numerous Federal corporations that have been in operation down through the years. Whether, however, such a new agency needs to have corporate status or can be content with a resting place in one of the existing Federal departments will not be argued here. That issue can be settled in accordance with the needs and views that will surely make themselves heard in any congressional debate on this topic.

By Federal law, a corporation or other agency could be created for eastern (and, for that matter, western) river basins and given the functions set out above. Such an agency might individually report directly to the President, and further both Federal and State members might sit on its governing body. To some extent such an organization would share many characteristics with a Federal-interstate compact agency of the nature described in the foregoing paragraphs.

Here, at any rate, are two rather new ideas which deserve serious discussion and consideration in the ongoing debate about water-resources administration. As water-use problems become increasingly serious in the East, the utility of the two devices will become increasingly clear. New ideas are still to be generated, of course. What is important is that all ideas be placed on the table and that all receive due consideration in the public forum and in legislative and executive discussions at both Federal and State levels.

A specific proposal for a Delaware River Basin structure.—Whatever value attaches to the Syracuse University proposal for an organizational structure to manage Delaware Valley water resources comes in good part from the very careful basis on which those proposals were made. The history of American water-resource development, public and private, was carefully reviewed. Contributions made to the science of water-resource development by the various academic disciplines were surveyed. The special attributes of the Delaware River Basin and the local conditions to which any new structure must be fitted were examined with care. A systematic effort was made to understand the political structure of the basin insofar as it relates to water.

This latter point deserves special emphasis. By interviews, questionnaires, and other survey techniques, and by thorough examination of the governmental records in the basin, the centers of power in legislative and executive branches were examined with relation to the principal segments of the water-resources issue. Throughout the course of the Syracuse study, this question was kept uppermost: What is it possible to do in the Delaware? The conclusions arrived at therefore have a special setting. It is asserted only that the recommendations made have validity for the Delaware. Nonetheless, many of the elements involved will have relevance for other basins where physical, social and economic conditions more or less closely resemble those of the Delaware area.

The Syracuse study emphasizes the need for recognizing the dynamic character of the problem of organizing for water-resources administration. New governmental arrangements for the basin are conceived, therefore, in two phases. The first phase would be marked by passage of a congressional statute to create a new Delaware River Agency for Water (DRAW). This transitional agency could undertake guidance of the initial steps of water development. The second phase would begin with the creation by the four basin States and the National Government, by a new kind of compact, of a Delaware River Commission (DRC) completely to replace the first-phase Federal agency.

A little reflection will reveal the reasoning behind this two-phase proposal. First, the precise ways of creating a basin agency by Federal statute and the general outline of duties to be given to that new organization are very clear. This is not the case with the Federal-interstate compact idea. A number of crucial issues still remain to be resolved in creating such a compact and such an agency. Second, experience seems to indicate that a satisfactory statute might be passed by Congress fairly promptly and Delaware Basin water development begun. If Basin representation in Congress is able to engineer the creation of such an agency, the pressure will be removed from the States and the Federal Government in their compact negotiations. Such negotiations can proceed in an atmosphere of relative calm: The knotty questions involved in writing a new compact can be studied by the negotiators with the assurance that water development is getting underway under the aegis of the new federally based agency. Third, it is clear that the main financial source for Delaware development in its early years will be the Federal Government. The greatest part of the funds for major physical structures, for which substantial aid will come from Washington, will fall into the initial period. Congress naturally will wish to keep a close watch over these Federal expenditures, hence it is logical to assume that a Federal agency will be a more practical instrumentality than would a partly Federal agency. As the need for large capital outlays diminishes over time the States, along with the beneficiaries of the various projects, should be able to assume an increasing share of the costs. As their shares become larger, the legal foundation of the basin agency may appropriately become the Federal-interstate compact.

Finally, the two-phase concept is eminently sound because the Nation as a whole must necessarily have an interest in the creation of a sound framework for Delaware Basin water administration. The national interest is most easily recognized in the flood control, navigation, and water pollution areas, but it extends to other aspects of water use as well. On the other hand, as water shortages become more threatening in the Delaware and the need for increasing control over withdrawals and diversion increases, the interest of the States will become more evident.

In the 3 months since the Syracuse report has been released, officials in the four basin States and the principal cities have announced their intention to bypass the first phase of the Syracuse report and proceed immediately to negotiation and adoption of a Federal-interstate compact. In so deciding they run several grave risks that may not be immediately apparent. First is the risk that a compact will be signed that is inadequate to achieve the extraordinarily varied program needed in the Delaware Basin. For example, it is difficult to see at the present time how a compact-based organization will be able to gain operating control of the new structures that may be built in the next few years by the Corps of Engineers. Second, the current compact drive apparently ignores completely the probable circumstance that no substantial amounts of capital are going to be provided by Delaware Basin States. Third, the views of the various Federal administrative agencies already working in the water field in the Delaware are not being actively solicited by leaders in the current compact drive

Fourth, a compact negotiating effort runs the risk of immortalizing a specific allocation of water among the States. This development would be catastrophic for the Delaware Valley in the long run, as it would be indeed for any dynamic, heavily urbanized, industrialized, growing region.

These risks are real. Any one of them might well be avoided by enlightened and vigorous leadership on the part of the compact negotiators, but it would be a miracle if all should be circumvented. One can wish these negotiators well, while at the same time expressing doubt over their prospects for success in creating an agency to meet the challenges of the population explosion and the rapidly expanding technology.

The first phase agency, DRAW, might be a five-man commission appointed by the President and reporting directly to him. The interest of the States could be recognized by having one member appointed by the President from each of the four States from nominees made by the Governor, while the fifth representative could be the President's direct choice. The question of having city or metropolitan representation was carefully examined in the course of the Syracuse research, but for reasons which will not be set out here the idea was abandoned as impractical. The second phase agency, DRC, could have four members appointed directly by the four Governors and the fifth appointed by the President. The arrangements for voting, meetings, salaries, and so forth could be settled in about the same fashion for both DRAW and DRC.

In both cases the commission is conceived as a policymaking body to formulate the principal goals and courses of action for the agencies. Decisions might be taken by majority vote when working consensus could not be reached. The staffs, which could include the same individuals in both cases, could be organized along the unitary lines that have proved so successful in private enterprise and in many public agencies. A general manager with full administrative powers should be empowered to carry policies into effect. He should be authorized to appoint such other officers and employees as are necessary. All appointments should be made without term on the basis of merit alone, and salaries should be high enough to attract talented personnel regardless of residence.

Means of keeping DRAW and its successor, DRC, responsible to the public are at hand. Since the President appoints the members of the first agency, he will have the power to discharge them. In the second phase he could discharge the Federal member at any time and it could be made possible for individual Governors to discharge their appointees. In addition, President and Governors could be given either absolute or provisional vetoes over commission action. For example, provisional vetoes by the Governors could cause DRAW or DRC to delay, say, 3 months before putting the decisions into force. The interim would allow for discussion and for commission reconsideration of any contested action. Annual and periodic reports could be required and of course an annual audit should be mandatory.

As to area of geographic jurisdiction, the Syracuse study conceived of a region of variable boundary formed from a series of overlying single-function areas and centering on the Delaware River's watershed.

Such an organization could supply the basin with a viable and responsible central agency, fully able to exercise the strong powers outlined above and to satisfy the basin's need for unified administration of its water program. It will be recalled that those powers by and large are not powers exercised today. The planning function, the representation and information function, the operation of the new water control structures for all the multiple purposes they may be designed to serve, the prevention of pollution and improvement of the quality of the water in other ways, and the coordination of existing or future programs by all Federal, State, and local agencies in the basin go to make up a package of functions that would fill a serious gap.

It is worth reiteration that the second-phase agency, DRC, should be able completely to replace the federally constituted DRAW. No reason has been uncovered that would prevent the composition and terms of the commission and the functions, rules and regulations, and working methods of DRC from being the same as those for DRAW. The subject of transferral from the first agency to the second would, of course, require further examination, and it should be a major topic for study by DRAW's staff, for discussion in Congress, and for consideration in the course of future compact negotiations.

One function not mentioned so far in this paper—that of water withdrawal and diversion control—deserves further comment in this connection. This will be the area in which steps ultimately will be most necessary and the shift of

responsibility from a Federal to a Federal-interstate agency most complex. If, by the time of DRC's creation, DRAW has encompassed the power, transfer to DRC will be simple. If responsibility for the power remains in the several State governments at that time (where it is today), the compact instrument itself could affect the transfer. By that time there will be much greater knowledge of the extent and character of Delaware water problems (particularly ground water problems) and of the water law of the four Basin states, a subject largely unexplored to date. Further, better engineering and other technical means will have been developed for bringing about fuller and fairer control of withdrawals and diversions, and for relating them to the integrated management of all the basin's water resources.

Most of the ongoing water-related programs in the Delaware Basin are today contributing positively to better water use, and the program for development described in the Syracuse study envisions their continuation. Among these, for example, are the building of local flood-control structures, water supply systems, sewage disposal plants and mains, and power distribution facilities; recreation and fish and wildlife projects; small watershed programs; other soil conservation and forestry measures; and so on. Existing grant-in-aid programs in these fields should not be interrupted, but instead should be invigorated and broadened through the improved communication and through the advice and assistance, financial and otherwise, provided by the new basin agency.

Several Federal, State, local, and private agencies have built and will build water control structures that should in the long run be made part of the integrated river control system. The cases of the Catskill dams of the New York City Board of Water Supply, the planned Raritan Valley structures for New Jersey, the proposed Brandywine dams for Pennsylvania, and the structures owned by several private companies in the basin come immediately to mind. The new basin agency through its plans, budgets, and other means ought to be able to assert itself forcefully, both in Congress and in State legislatures, with respect to operation of these structures and with regard to similar new structures. Furthermore, the new basin agency should be able to carry out new construction itself.

As a key device for consultation throughout the gamut of intergovernmental cooperation possible in the basin and nearby areas, DRAW and DRC should establish an Intergovernmental Advisory Committee. Both the Federal statute and the Federal-interstate compact should make provision for such an agency. On it should sit representatives of the public; national, State, and local water-resource agencies; water-using industries; labor; and agriculture. Through this committee, both DRAW and DRC could enlist the participation of all interested organizations and persons. They would find the committee a highly useful means of contact with important elements in the basin, and a device for conveying information to the people and for sounding out public opinion as well. They might further find it advantageous to employ the committee as a channel to extend their advice and aid to State and local agencies and to the public.

Financial policies

There are no comprehensive water-resource development programs anywhere in the country that have not depended heavily on Federal administrative and financial assistance. Indeed, there are very few major water programs of any type that have not utilized Federal funds. The Miami Conservancy District in Ohio is almost the only exception, although California now proposes to invest major sums in its water development program. Here again, however, the Federal Government will have an important role to play.

In eastern river valley development it is not reasonable to expect any dramatic departure from established standards of Federal participation. It is not realistic to believe that Eastern States will assume financial responsibility for billion-dollar water-development programs. There are a number of reasons for this. State revenue sources are not as elastic as the revenues of the National Government, so that increases in wealth and income do not bring the more than proportionate revenue increases that the Federal Government obtains. State tax structures are highly sensitive to economic decline so that a mild recession brings crises in State budgeting. Moreover, the States are in competition with one another for the attraction and expansion of industry, and State legislatures are most reluctant to increase tax rates for fear of losing economic activity to competing States. Eastern States cannot be said to be impoverished in any absolute sense, but for a number of institutional and structural reasons are unable to tax heavily the wealth and income within their borders.

It follows that if the water needs of Eastern Seaboard States are to be met in the next several decades the Federal Government must necessarily assume a major program and financing role. This can be accomplished by the application of Federal water-resource policies that are already well established and by some modest extensions in specific areas. The responsibility that the National Government has traditionally assumed for flood control and navigation will be important for the development of eastern river valleys. The data gathering activities of the Public Health Service, the Geological Survey, and the Weather Bureau need to be strengthened in their applications to eastern valleys. Similarly, the Public Health Service should be encouraged to work even more broadly and extensively with State agencies in pollution abatement. The loan programs of the Public Health Service for pollution control and the community facilities program of the Housing and Home Finance Agency will be helpful in specific situations.

Beyond these established programs, there are three areas where an extension of Federal financial support could be most useful. The first of these is Federal participation in financing water supply storage. As noted above, the Omnibus Rivers and Harbors and Flood Control Act of 1958 took a major step forward by providing for Federal construction in advance of need. If the Congress should decide to go farther in this direction as water needs become more critical, it would be possible to build on the principles of this legislation in ways that would be helpful to the development of eastern river valleys. The 10-year period of grace before reimbursements are to begin could be extended to 15 or perhaps 20 years and, of course, a portion of such storage costs might be treated as nonreimbursable.

A second program area of particular concern to the eastern seaboard is recreation, in which field more active Federal involvement appears crucial. There is good evidence to suggest that recreation investment is now undervalued in the planning procedures and cost-benefit analysis utilized by Federal water-resource agencies. Legislation that has been introduced in Congress in previous years to remedy this situation has not been enacted. The interest of comprehensive water-resource development in eastern river basins would be furthered if primary recreation benefits were established above their present low level and if Federal water-resource agencies were to adopt a less restrictive land acquisition policy for reservoir sites. It may be hoped that the Outdoor Recreation Resources Review Commission will propose greater Federal involvement in regional recreation programs.

A third area in which the Federal Government might assist in financing eastern river valley development is in low flow augmentation, an activity which is destined to become increasingly important in the East. The provision of more adequate minimum flows would improve both the quantity and the quality of industrial and municipal water and bring generalized benefits from pollution abatement. If the Congress were to enact and the President to sign a low flow provision similar to that embodied in the vetoed section of the Omnibus Rivers and Harbors and Flood Control Act of 1958, development programs on eastern river valleys could be expected to benefit. Such a provision, of course, would need to be carefully administered to assure that specific water users did not receive windfall benefits financed from the Public Treasury.

Financial policy for eastern river basin development is very closely related to the administrative structure that is to be responsible for that development. Over the next several decades, as eastern water needs become more critical, decisions about administrative structure and the interrelationship of Federal and State authority therein will necessarily be made. As indicated above, the proposals made for the Delaware Basin call for the establishment of a central administrative agency, and there is no apparent reason why some similar device cannot be employed in other eastern river valleys. If this kind of administrative pattern can be assumed and projected for other river valleys, then it is possible to outline a financial model whose general terms should have rather wide applicability throughout the east. This policy model would have the following characteristics:

First, the Federal Government would continue to provide capital and operating funds for navigation and flood control and for data gathering activities, and would make a modest annual appropriation to specific basin agencies as they are established.

Second, the National Government would extend its financial support for industrial and municipal water storage, for recreation, and for low flow augmentation.

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Third, a major part of costs for industrial and municipal water supply would be met, as has been historically true, by State and local interests. In each valley, a basin agency would have responsibility for planning for water supply and water distribution systems. This agency would negotiate contracts with industrial and municipal water users and assume responsibility for reimbursement of the Federal Government's investment in such water supply storage facilities. Eventually, perhaps by the turn of the century in a number of eastern river basins, all investment in water supply storage could be put on a self-liquidating basis. Basin agencies may one day be administering a succession of water supply grids comparable with electric power grids.

Fourth, if the basic investment in recreation lands and structures can somehow be provided, State and local governments can be expected to provide substantial support for the administration and current operation of recreation programs. There will be financial difficulties, however, even on operating account. Most State recreation agencies charge revenues that cover barely one-quarter of current expenses. State recreation agencies will need to explore the possibilities for a pattern of differential pricing for recreation, in an attempt to increase revenue. This might take the form of providing a rather wide range of recreation services at reservoirs, extending to certain luxury-type recreation activities, although in a framework that continued to emphasize the provision of some facilities at minimum user cost.

Fifth, revenue from hydroelectric power can contribute materially to the furtherance of other aspects of water-resource development programs in eastern river valleys. Power revenues have been historically a very important source of support for water-resource projects in other parts of the country, particularly for irrigation projects in the west. Although hydroelectric power cannot be expected to provide revenues of comparable significance in eastern developments, even a few million dollars a year in any specific basin would be very helpful in the support of a comprehensive water program. The public development of hydroelectric power is, of course, a very controversial matter. If this power is to be developed with Federal funds it is reasonable to expect that the preference clause would control its sale. At the same time, the most economical use of hydro power in eastern valleys is for peaking purposes. This suggests that hydro power should be marketed in a pattern similar to that of the Southeastern and Southwestern Power Administrations, with wheeling and firming contracts with private power companies, but with the rights of preference customers assured. There seems to be no reason why this pattern could not be effectively applied to eastern valleys and extended to include the hydro potential that may come from the installation of pumped storage facilities. If net revenue from the sale of power is to be used to promote other aspects of water-resource development, however, it will be necessary that the power be marketed at a figure above minimum assignable cost.

Sixth, there are some other revenue possibilities that should not be neglected. State governments should be able and willing to make modestly increasing annual appropriations for water development in all of its aspects, even though they cannot be expected to carry the whole financial burden. In addition, there are some possibilities for devising new types of water revenues for application in the east. Once a basin agency is established, it may be possible for that agency to administer a permit system for water withdrawals. The minimum user could be exempt from any charge, but above a specified level of water use modest fees might be exacted for both ground and surface withdrawals. The schedule of charges could be geared to the quality of return flow for both the industrial and the municipal user. That is, if the return flow were heavily polluted, the charge would be higher. This would encourage users both to economize in water withdrawals and to reduce pollution. There are some technical and equitable difficulties in devising such a schedule for water withdrawal charges, although apparently no important legal obstacles. Certainly, as industrial and municipal water on the eastern seaboard becomes more scarce and hence more valuable it would be appropriate to levy a reasonable charge for its use.

A financial policy for eastern water-resource development will be difficult to work out because of the necessary accommodation of Federal, State, and local interests, and because much of the investment must be made in the next 10 to 15 years, even though intensive utilization of the structures and facilities will not come until perhaps the turn of the century. But once there is sufficient general awareness of the nature and significance of the water problem in the East, it will surely be possible to resolve the conflicts over financial policy and to reach

agreement, with respect to a given river basin, on a long-range development program.

Senator HART. I am not going to gild the lily by saying other than we have benefited by your thinking on this.

Mr. MARTIN. Thank you, sir.

Senator MOSS. I am very grateful for the statement that has been given by Dr. Martin and his particular emphasis on the full river basin development. It is something that has been apparent for quite some time but we had a little hard time getting general acceptance of that idea.

Senator HART. Your willingness to tolerate the Federal Government also is appreciated.

Senator MOSS. Yes; especially when you said the Federal Government was your Government, too; that is refreshing.

Mr. MARTIN. I went as far as I thought I could go, gentlemen, in New England.

Senator HART. At this point I should like to place in the record a statement that was delivered to us by the director of the National Association of Soil Conservation Districts, Hans L. van Leer, who is here, but stated that in view of the time he would be content to have his statement made a part of the record.

Mr. van Leer, would you stand so I could comment specifically on your reference to watersheds.

As you sensed during the day, all of us are concerned with the older experiences under this act. I, for one, think that, although it is not as dramatic as the dams built in the West, it is very meaningful to those of us in the East. At the moment I consider Michigan as being in the East. This program would be more appropriate and more suitable for our needs.

I appreciate especially your reference to that.

Mr. VAN LEER. Thank you.

(The statement referred to follows:)

THE NATIONAL ASSOCIATION OF SOIL CONSERVATION DISTRICTS,
South Lincoln, Mass., December 8, 1959.

SENATE SELECT COMMITTEE ON NATIONAL WATER RESOURCES,
Federal Building,
Boston, Mass.

DEAR MR. CHAIRMAN: As director of area I, I represent the 12 Northeastern States of the National Association of Soil Conservation Districts. We are vitally interested in the conservation of soil and water resources. In Massachusetts, the large amount of water conservation is carried out by the soil-conservation districts through such projects as ponds for irrigation and livestock, drainage ditches, tiling; these projects are examples of the great need for the conservation of water in our State.

Under the present Small Watershed Act (566), the districts are sponsoring several flood control projects in Massachusetts. As chairman of the Committee on Watersheds of the Massachusetts Association of Soil Conservation Districts, I urge this committee to recommend continued support of 566.

The need for additional research on soil absorption, water runoff, erosion is apparent. Urban encroachment on farmland has changed the runoff pattern.

I am chairman of the Middlesex Soil Conservation District, sponsors of the SuAsCo watershed; we recommend multiple use of structures on the Asabeth River. Other future uses besides flood control are presently not included in the work plan. These future uses include water storage for irrigation, drinking-water supply, antipollution, recreation. Federal participation would be desirable. Cost-benefit requirements nullify the usefulness of the law in many cases. The noticeable decrease of the present farm population and the serious decrease

of class I and II land calls for serious planning to conserve the land of farms where the water falls.

Sincerely yours,

HANS L. VAN LEER, *Director.*

Senator HART. Also, the statement of Philip P. Farina, who was here this morning, will be incorporated in the record.

He appeared as a member of the Massachusetts Water Resources Commission and as president of the SuAsCo Watershed Association, Inc.

(The statement referred to follows:)

STATEMENT OF PHILIP P. FARINA, OF WAYLAND, PRESIDENT, SUASCO WATERSHED ASSOCIATION, INC., MEMBER, MASSACHUSETTS WATER RESOURCES COMMISSION

Massachusetts is fortunate in comparison with many other States. We are endowed with a quantity and a quality of water which are unsurpassed.

Nevertheless, the expansion and complexity of our economy and the spreading out of our population have complicated our water problems so that our damages are higher and our solutions more difficult than those of many regions given less by nature.

In my particular area, the Sudbury-Assabet-Concord Rivers watershed, which is the center of population of Massachusetts and the scene of its largest home, business, and industrial development, use of the land is heavy and water problems become worse by the week.

Extremes of too much water and too little water are sharper and sharper. Storms—not only like Hurricane Diane of 1955, but yearly spring thaws and rainfalls—cause destructive floods.

You in Congress have accepted Federal responsibility for our water resources. I fully appreciate the difficulties of a standard approach to water management, because of differences in geography, interests, and needs. A water-management plan which was ideal for a wide-open, single-economy area might do more harm than good here in Massachusetts.

For the reasons stated, and many others, I believe that Federal assistance in water management should take the form of strengthening and aiding State or local programs, rather than attempting to do the whole job at the Federal level.

Our experience with Public Law 566 in the SuAsCo watershed has been confusing, disappointing and, to date, dismally unproductive. Whether this law will work elsewhere, I may not be qualified to state. After more than 4 years of trying to help make it work in Massachusetts, I am forced to conclude that the law will do us very little good as it stands.

If the money already expended on the SuAsCo project had been allotted instead to assistance on a State project, we would now have water management, rather than a set of weak and incomplete plans.

We have been bitter over some of our disappointments, but this statement is made with objective and constructive intent. I shall list some of my objections to the Public Law 566 program as we have known it, and will then go on to discuss these objections in more detail. Here is the list:

1. The program was oversold at the start.
2. Engineering has been inadequate.
3. The designation of soil-conservation districts as "sponsoring local organizations" is unsatisfactory.
4. Criteria and formulas have been too rigid and unrealistic at times, but interpretations of these criteria and formulas have been vague and sloppy at other times.
5. Benefit-cost ratio figures are based on damages from one major flood, projected over a period of years, and do not take annual flooding into account.
6. Rules, regulations, and interpretations change frequently, causing confusion and ultimate loss of faith.
7. Much money has been wasted in compiling data already available from State agencies and previous surveys.

Now, to elaborate:

When representatives of the soil conservation district came to us after the hurricane Edna flood of 1954 with the proposition that Public Law 566 of-

fered us a solution, we rushed in wholeheartedly, accepting statements at face value with a naïvete which now amazes us as we look back across some 5 years of trying, hoping, and being let down.

We were given to understand that the eventual plan would be ours, with the Soil Conservation Service acting as our consultant. We would have a cooperative effort in developing a plan satisfactory to everybody.

Our hopes and our faith in the program were broadcast through watershed-wide meetings and in a tremendous public-relations program, the press, daily and weekly, gave us columns of space.

An example was the purchase (or lease) of an expensive eletronic fathometer by the SCS, to take a profile of the river bottoms. We publicized this ecstatically, with stories and pictures in most of the papers of eastern Massachusetts. A few weeks passed, and we were told that this project had not worked out. It didn't matter though, we were assured—the profile of the river bottom and obstructions was unimportant.

Later, there was an aerial survey of the watershed. The survey was made in early autumn, and the changing foliage made it easy to locate swamps on color photographs. To our knowledge, this was all that was accomplished through the aerial survey. The same time spent over topographical maps, it seems, might have produced the same information at much lower cost.

When we made application for a project under Public Law 566, we (the SuAsCo Watershed Association) were told that we did not have the qualifications to be a sponsoring local organization under the law. The Middlesex and Northern Worcester County Soil Conservation Districts were to be the sponsors, legally, but it would still be our project.

Meetings were held, and we worked out some nice agreements with the SCD's. We were to have final say on approval of plans. The SCD's were our kindly legal uncles. This impression lasted for quite a while—almost until the Soil Conservation Service engineers came up with a plan.

We rejected the plan as imperfect, incomplete and a waste of money. At this point, it developed that the SCD's were really the sponsors of the project. We were the errand boys and publicity agents.

The SCD's approved the plan. However, they have cast aside their working force, SuAsCo, and it is doubtful if this foolish, wasteful plan ever can be carried out..

When the awakening came, we saw the folly of ever having placed control of our project in the hands of a group which represented only one of the watershed's many, many interests. Their interest, agriculture, was a heavy loser by bad water conditions, but in this watershed it was not the heaviest loser.

Industry, homeowners, municipal highway, water, and public works departments, recreation and wildlife enthusiasts had contributed to the making of a plan, but when the chips were down, it appeared that participation of the people was just a myth—just a way of getting justification for spending a lot of money without focusing the blame where it belonged if (as it did) the project failed.

The inescapable conclusion is that a soil-conservation district is not a suitable sponsoring local organization. It is too closely akin to the Soil Conservation Service; depends on the SCS for funds, and has little freedom of choice in considering an SCS proposition.

In our case, the SCD's have failed to demonstrate a satisfactory understanding of or sympathy with the problems of other interests. Nor, in approving a plan which qualified engineers tell us is little more than an excuse for having spent 4 years and much Federal money in the watershed, have the SCD's demonstrated reasonable judgment.

We are dealing with conservation services, but we have been appalled by their lack of consideration for conservation and watershed-protection measures.

The plan states that a vast amount of conservation work will be done. When we asked how it would be done and who would pay to have it done, we were told, "If you say it will be done, that is acceptable to us."

The Department of Agriculture preaches the watershed approach and water management, but as we have seen this program developing here, it is purely an attempt—and a grossly inept attempt—at flood control.

As for flood control, I fail to get it through my layman's head how even flood control will be achieved for the Sudbury, Assabet, and Concord Rivers by installing in the upper reaches of the Assabet a number of small reservoirs which will fill in a matter of hours.

We concede that there have been competent engineers on this project, but there never have been enough of them. When we have pointed to this weakness, we have been told that a considerable portion of the money spent here could be justified as training and educational expense.

The criterion that any floodwater-retaining structure must control the runoff from 4 inches of rainfall in the watershed behind the dam is patently absurd. In our Baiting Brook subwatershed in Framingham, this requirement resulted in choice of a damsite so far upstream that it controlled a very small percentage of the brook's significant flow. It controlled 4 inches of rainfall above the dam, all right, but only that which originated on one of the brook's many branches.

When we asked for consideration of another site, downstream on Baiting Brook, we were told that it couldn't be justified for benefit-cost ratio. We pointed out that we had put too low an estimate on land value at the accepted location, and that a reasonable reappraisal made that site too costly. We were told that the original figure was in and would stand.

Yet, since that time, another site on Baiting Brook has been surveyed by SCS and has been found feasible. It is a site which State and Framingham town engineers had considered the most promising from the start.

We could laugh about some of the fumbling we have witnessed, but we are too embarrassed. Our publicity barrage in the early days of this program placed us in the same boat with SCS.

We were told at the outset that any plan must be a complete solution for the entire watershed. Yet Baiting Brook was segregated, and now the Assabet River has been segregated. We are told that additional funds will be spent on Sudbury and Concord River surveys in the future. Is this one integrated plan?

Seeking easements as part of the local contribution, we have given people implicit guarantees that we would have one overall program. Rules and regulations have been changed, but we have managed to keep the peoples' faith.

Our conviction, which we passed along to people who gave us easements, was that once the work was started it would be carried through to a finish.

We have since learned that when the project enters the construction stage, the Federal Government does not guarantee that the whole project will be completed. It is divided into yearly programs. If Congress does not appropriate additional funds as one stage follows another, work will stop.

The benefit-cost ratio should not be the only criterion for economic feasibility of a project. In a densely populated, highly industrialized area like ours, intangible damages can sometimes be greater than the tangible.

Wages are lost until industries are able to reopen. Flooded roads bar access and cause absenteeism, even where factories are not directly damaged by floodwaters. How long a farm field or an object remains under muddy water may have as much bearing on the damage as the mere fact that it was under water.

An element that should be given heavy weight is the duration of high water, not merely its extent in acreage. Annual swamping or flooding damage should be added in with the figures for great floods.

The Government loses taxes when a company does not make the profits it would have made if it had not been flooded.

If there is one major conclusion to be drawn from our experience, it is that money now being spent in support of Public Law 566 could be put to infinitely more effective use if it were granted to existing State agencies for projects approved by the Federal Government.

Senator HART. I understand that a spokesman for the New York State Power Authority, John Bruel, is present.

Mr. BRUEL. Right here, Senator.

STATEMENT OF JOHN C. BRUEL, SECRETARY, POWER AUTHORITY OF THE STATE OF NEW YORK

Mr. BRUEL. My name is John C. Bruel, secretary of the Power Authority of the State of New York. I am reading a statement of Robert Moses, the chairman of the authority, for this committee.

The statement follows:

This statement is presented because it is our understanding that the question of the use of Great Lakes system water will be before your committee. The position of the power authority follows:

The power authority, a public corporation of the State of New York, is a licensee of the Federal Power Commission for the construction, operation, and maintenance of the St. Lawrence and Niagara power projects. The Niagara license was issued by direct mandate of Congress. As such licensee, the authority is entitled to use all of the U.S. share of the waters of the St. Lawrence and Niagara Rivers available for power.

On the basis of its licensed right to use such waters, the authority is now operating the St. Lawrence power project which it constructed at a cost of $350 million borrowed from prudent private investors and is well along in construction of the Niagara project at a cost of about $720 million, of which $400 million has already been obtained from the sale of revenue bonds. The Niagara project will begin initial operation early in 1961.

Both the St. Lawrence and Niagara projects are financed without State or Federal credit of any kind. The authority depends entirely upon revenue from the sale of power to pay off its bonds. Any reduction in the amount of water available in the Great Lakes-St. Lawrence watershed reduces the power which can be generated and sold by the authority, and any loss of power would increase the price paid by power users.

In accepting its licenses from the Federal Power Commission, in financing these projects, and in fixing the rates for the sale of power to cover the costs, the authority relied on the law of the land, including court decisions, on the premise that we would have at least as much water available as was available when the licenses were accepted and on the legal right of the State of New York as a downstream riparian State to the natural flow of the Niagara and St. Lawrence Rivers.

In 1930, the Supreme Court of the United States issued a decree enjoining Illinois and the sanitary district from diverting any waters of the Great Lakes-St. Lawrence system through the Chicago drainage canal in excess of an annual average of 1,500 cubic feet per second in addition to domestic pumpage.

Recently three Illinois communities sought permission from the Supreme Court to make further diversions which, if granted, would establish a highly dangerous precedent for a whole series of additional and larger diversions by other communities.

On June 29, 1959, the Supreme Court of the United States granted an application by Wisconsin, Michigan, and New York, to reopen the decree of April 21, 1930, and appointed a special master to take testimony and evidence with respect to whether Illinois and the Sanitary District of Chicago should be required to return to the Great Lakes the water withdrawn from Lake Michigan as domestic pumpage.

The authority has no objection to the taking, by the sanitary district or any other agency, of water from the Great Lakes system so long as the water is returned to such system and not diverted to other drainage basins.

Proceedings before the special master began on October 19, 1959. Comprehensive testimony and evidence is being prepared for presentation by the litigants over the next several months. New York has made a motion for leave to file with the U.S. Supreme Court an amended complaint in the reopened case renewing its allegation of power loss which was struck out by the Court in 1927 on the ground that there was no showing that the Niagara or St. Lawrence would be developed in the foreseeable future.

In view of the reopening of the 1930 decree and the detailed evidence being presented to the special master on the problems arising from the diversions, international, national, State, and local, involving among others, the International Joint Commission, the Federal Power Commision, our partner on the St. Lawrence, the Hydro-Electric Power Commission of Ontario, which shares the construction cost and the power produced by the St. Lawrence, the Great Lakes States and their political subdivisions concerned with questions such as navigation, power, recreation, and sewage disposal, the master cannot be expected to conclude the hearings and make a report to the Supreme Court on its findings for many months. In addition, a decision from the Supreme Court will, of course, take further time.

Since the Supreme Court is exercising jurisdiction, we respectfully urge that your committee insure that no further water be diverted from the Great Lakes-St. Lawrence watershed unless it is returned.

That concludes the statement, Senator.

Thank you very much.

Senator HART. Thank you very much.

I regret I cannot speak for the committee, but I suppose it would come as no surprise for me to assure you that I shall make every effort to insure that water is not diverted from the Great Lakes.

Mr. BRUEL. Thank you very much, sir.

Senator HART. Mr. Francis E. Robinson, manager of the Natural Resources Department of the New England Council.

Mr. Robinson?

STATEMENT OF FRANCIS E. ROBINSON, MANAGER, NATURAL RESOURCES DEPARTMENT, THE NEW ENGLAND COUNCIL, INC.

Mr. ROBINSON. Senator, I have a very brief statement, but I think I can be even briefer if I speak on a couple of points.

My name you have, Francis E. Robinson, manager of the Natural Resources Department of the New England Council.

Senator HART. I wish to interrupt to say the statement in full will be incorporated in the record.

(The statement referred to follows:)

STATEMENT OF FRANCIS E. ROBINSON, MANAGER, NATIONAL RESOURCES DEPARTMENT OF THE NEW ENGLAND COUNCIL, INC., RELATIVE TO NATIONAL WATER POLICIES

The New England Council wants to emphasize to the committee the fact that the water-supply situation in New England differs sharply from that in some other parts of the country and that any policy adopted by Congress should have a flexibility which will permit adjustment of Federal programs to particular regional, State, and (frequently) local situations.

The 1955 report of the New England-New York Inter-Agency Committee indicates that the region's water supplies are adequate to meet regional needs for now and the forseeable future.

As New England's cities grow, it may be necessary to transport water from greater distances than is now being done; but there is no probability that this will require transportation of water over the long distances required in some other parts of the United States.

An important part of any water program for New England will be the improvement in quality of water supplies already near the water-consuming areas.

The most pressing immediate New England water problem may be that of flood control.

Current emphasis on the necessity for adequate flood control of New England rivers should be balanced with public understanding of the fact that the availability of a substantial quantity of good-quality water constitutes one of the region's outstanding advantages as an industrial location, as a growing area for a number of valuable specialty crops, and as a recreation area.

Recent hurricane-induced floods, together with authoritative predictions that the frequency of such storms is likely to remain at a relatively high level for the next few years, provides ample evidence that the building of a system of flood control dams and reservoirs and flood protection structures must be carried out as rapidly as men and machines can build them. The council favors appropriation by the Federal Government of sufficient flood control funds to solve the problem.

New England has been accustomed to using the device of interstate compacts to solve regional problems concerning water, and the council favors the continued employment of interstate compacts as a means of handling such problems.

During the past year, four States have agreed upon an interstate compact to establish a Northeastern Resources Commission. This is renewed evidence of New England's intention to work toward the solution of water problems on a regional basis.

When your committee reaches the point of considering specific legislation, I am confident that the New England Council will have further suggestions to present to you.

Mr. ROBINSON. The New England Council is an organization supported by dues, by 3,000 representatives of all segments of the New England economy. It is not a government organization but we are fortunate in having cordial relations with the State governments of New England and some of the individuals who are in those governments are members of the New England Council.

In general our statement underlines some of the viewpoints that already have been presented to you.

In summarizing it, I would say the keyword in our statement is flexibility. We are very anxious that any national water policy that is adopted recognize the sharp differences between the water conditions in New England and in some other parts of the country.

For example, we mentioned irrigation here today. When we talk about irrigation we talk about overhead irrigation which is totally different from that in some western areas and depends upon the different arrangement of water, the different handling of it.

The very first flood I ever saw was in your own State, Senator, and I know that the Saginaw River's flood was not like the rivers in New Hampshire where I now live.

Those points of view of course must be recognized I think in a national water policy, and I am sure they will be.

However, the New England Council's and New England's chief current interest of course is in flood control. We hope that funds will be made available as fast as the men and machines can use them to create the dams and the flood control projects needed for New England.

Beyond that I think we have no more to say today except that when your committee comes to more specific consideration of legislation we would probably like to be heard on particular points.

Senator HART. Thank you very much. I am sure the opportunity will be presented if we do have these further hearings.

Mr. ROBINSON. Thank you.

Senator HART. I understand that the water engineer of the city of Springfield, Mass., Peter C. Karalekas, wishes to testify.

STATEMENT OF PETER C. KARALEKAS, CHIEF WATER ENGINEER, SPRINGFIELD (MASS.) MUNICIPAL WATER WORKS

Mr. KARALEKAS. If I had a name, Senator, as short as Senator Moss I am sure I would not have any trouble in New England. The correct pronunciation is Kara-lé-kas.

Senator HART. I have finally found a region of the country where I thought I could pronounce everyone's name. I was considering myself very comfortable all morning long.

Mr. KARALEKAS. I have very few words to say. Some of the things I have to say have been said, but I would like to bring them out in my own simple way.

My name is Peter C. Karalekas and I am a public member of the Massachusetts Water Resources Commission and also chief water engineer of the Springfield (Mass.) Municipal Water Works.

As a member of the water resources commission, I would like to express my opinion relative to the necessary cooperation between public water-supply officials and the government agencies whose function is the construction of flood control and watershed improvement dams.

It is my opinion that a flood control dam should not be constructed without a full-scale study to determine whether or not public water supply and other water uses will or can be satisfied. As a municipal waterworks official, the importance of the provisions of Public Law 85–500, enabling waterworks to obtain water for future needs cannot be overemphasized.

It has been said that New England is blessed with an abundance of water. That day will soon have passed. The situation in Massachusetts will become serious in the next decade, and every source of water should be allocated now for the future needs of our State. Our city, by 1980, will need more water if consumption continues at its present rate.

The proposed Littleville flood control dam, to be located on the Middle Branch of the Westfield Little River in the town of Chester, Mass., offers a source of additional water. In their preliminary planning and design of this reservoir, the Corps of Engineers has been requested to consider a yield of 20 million gallons a day for the city of Springfield.

A multipurpose reservoir development can best be illustrated by describing one of the most successful such developments in the United States. The city of Springfield and an electric company have been utilizing the same water resources for over 26 years, with mutual benefit to the city and the utility. This arrangement has been a subject of a paper by the speaker and a copy is enclosed for the committee's information.

It is my opinion that the terms of the present Public Law 500 should be altered to allow municipalities sufficient time to pay for additional water storage should the water not be used within the time limits prescribed. Many water departments, because of wartime shortages of materials and inflation, have formidable backlog of essential water expansion and distribution system improvements.

One out of every five communities in this country is deficient in its basic supply of water. The terms of Public Law 500 should also be altered or made flexible so that some consideration can be given to aid in the cost of piping water from distantly located reservoirs to the municipalities. This problem is a very serious one in the case of Springfield because it will be necessary to construct a pipeline 14 miles long to bring the water from the proposed Littleville Dam to the water-filtration plant. It is estimated that this pipeline alone would cost some $5,500,000.

The development of sufficient water resources for the future is a gargantuan task—too great to be met by municipalities alone. I urge the Congress of our country to enact a Water Resources Act to work with other State agencies to meet the water depletion crisis which can and I am convinced, will, befall us. Without sufficient water, cities cannot grow. Without water, urban redevelopment must stop.

Finally, it is my sincere hope that cooperation between the municipalities and other interested organizations will be maintained with

all the Federal agencies directly concerned with such resources—all for the fullest development of the economic future of our country.

Gentlemen, thank you very much.

Senator HART. Thank you.

Thank you especially for the specific illustration.

Senator MOSS. I am very pleased to have that specific recommendation. This select committee, of course, is one for gathering information and making a report to the standing committees of Congress. But this is the sort of thing that we need to include in our report, and your recommendation will be given every consideration.

Mr. KARALEKAS. Thank you very much.

Senator HART. I should add at this point the composition of the select committee reflects the membership from the four standing committees of the Senate which have jurisdiction over some aspect of this admittedly somewhat confused Federal series of hands in the water picture.

The four committees of the Senate from which has been drawn the membership of this select committee are the Committee on Public Works, the Committee on Agriculture and Forestry, the Committee on Interior and Insular Affairs, and the Interstate and Foreign Commerce Committee. So that when these specific recommendations are developed in our hearings which have application to bills which will be the subject of consideration by one of the standing committees, the representation on this committee can take the testimony into that standing committee.

A request has been made by Mr. A. A. Solander, a sanitary engineer, for an opportunity to make a statement.

We will be glad to have it, sir.

I should say also that Harry L. Kinsel, a consulting engineer in this city, who was here this morning, is filing a statement for the record which will be incorporated at this point.

(The statement referred to follows:)

STATEMENT OF HARRY L. KINSEL, CONSULTING ENGINEER

My name is Harry L. Kinsel. I am a partner of the consulting engineering firm of Metcalf & Eddy, 1300 Statler Building, Boston.

As engineers we are called in to advise municipalities, industries, and States in matters relating to development of water resources for public and private supplies and to the control and prevention of pollution thereof. Our work brings us in contact with problems relating to such matters pretty much over the United States.

Diversity of conditions throughout the country has resulted in a variety of approaches to some of the problems and policies connected with the use of water resources. Since drainage areas are no respecters of State boundaries, the logical handling of water resources on the State rather than Federal level appears to be by interstate compacts, as in the case of the Ohio and Delaware Rivers, or by river boards as in England. Federal participation may well be confined to advisory and research activities.

It should be pointed out that the prevention of wasteful use of water and the abatement of undue pollution of lakes and rivers are two areas in which conservation of our water resources may be furthered.

Senator HART. Go ahead, Mr. Solander.

STATEMENT OF A. A. SOLANDER, ENGINEER, SOUTH HADLEY, MASS.

Mr. SOLANDER. Thank you.

My name is A. A. Solander. I speak as a citizen, as a resident of South Hadley, whose western boundary is along the Connecticut River, and I have had a lifetime interest in this water.

Some of my remarks in connection locally may be applicable to some of your other metropolitan complexes throughout the country. I will read the remainder.

My comments include the appended map that has been prepared to give a quick, comprehensive, picture of the general status of public water supplies and sewage treatment along the southerly section of the Connecticut River Valley in Massachusetts including the Springfield metropolitan area. No data on industrial water supplies and waste treatment are possessed. The total population of all communities shown is 440,000; those that border on the river total 367,000.

The information on the map shows the effects of the traditional New England town pattern of government; namely, most communities secure separately their water supplies and treat their own wastes based on town lines.

A regional planning and cooperative approach to the water problem is noted in fire district 1 of South Hadley and Chicopee as they obtain water from the Quabbin Reservoir, a part of the metropolitan district commission; also Southampton from the Holyoke system.

A similar situation will be noted for the six communities served by the Springfield supply. In addition, the regional approach has been used for sewage treatment at Springfield where the Bondi's Island plant also treats sewage from Agawam and will treat West Springfield.

If our water resources are to be preserved at the least cost, it would seem that an area study, and/or plan, should be made for water and waste water, both public and industrial, in heavily populated areas such as we find in the Connecticut Valley. Elimination of State, county, town, political, and other manmade barriers may show that sanitary districts will provide the most economical solution; the economy can be passed on to the inhabitants and industry. Lower taxes obviously place our industries in a better competitive position, nationally and internationally.

It will be noted on the map that Chicopee, Holyoke, and South Hadley have a 1955 census of 113,591. They are contiguous communities with existing sewers. Three individual intercepting sewer layouts and treatment plants are in the plan, design, and/or ready-for-construction stage.

To my knowledge, a study has never been made to show if a savings would accrue from a single treatment plant. Possibly the river would, on the whole, be cleaner with a single discharge rather than three.

The regional solution was not used in the recent construction of new plants at Northampton and Easthampton. It will be seen from the map that their sewer outfalls are not too far apart.

It seems to me that a broad program of water resources, their preservation, utilization, and allocation, should include consideration, study, and/or research on the following:

Probably some of these have already been contributed in your hearings.

1. Our salt and fresh-water resources, including fish and other products, lose their value if they become contaminated beyond tolerable limits by radioactive material. This contamination which may last for many years is entirely different than pollution by organic matter. Therefore, international agreements on the disposal of radioactive wastes to preserve our water resources are needed, unless new treatment methods are devised. Not only agreements on waterborne, but airborne, wastes, since the latter shortly descend along with precipitation.

2. Economies that may result from the topographical, regional, or metropolitan approach for both water supplies and waste treatment, public and industrial. This might include regional sludge-treatment plants.

3. Sewage sludge modification for wider use as a fertilizer, source of heat, or other reclamation values.

4. Obtaining fresh water from sea water plus reclamation of chemicals.

5. Methods to prevent silt deposition in ponds, lakes, and reservoirs, and the removal of silt after it has occurred.

6. Manmade precipitation and weather control.

As a humorous addition here, I personally feel it is unfortunate that our Connecticut Valley resources do not include one or more groundwater supplies such as we find in other parts of the country in which the optimum content of fluoride is found naturally. We would then have an opportunity to locally compare the number of decayed, missing, and filled teeth found among people in naturally fluoridated water areas, as compared to areas without this chemical.

It has been a pleasure to contribute from my background and to prepare these comments for the Senate Select Committee on Water Resources. The background consists of a formal engineering education and registration as an engineer-surveyor; over 15 years of sanitary engineering, mostly in governmental employ; and the past 10 years of private engineering practice, mostly land surveys.

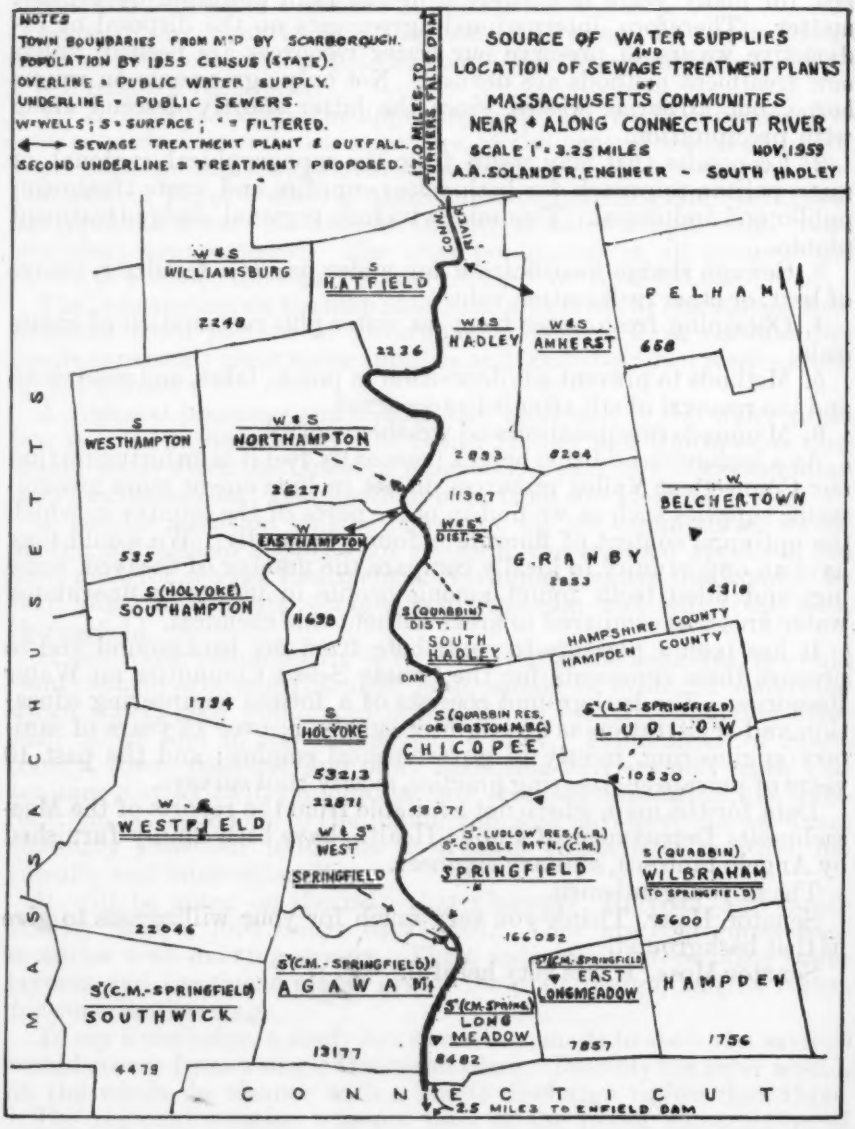
Data for the map, where not available from the reports of the Massachusetts Department of Public Health, have been kindly furnished by Angelo Iantosca, sanitary engineer.

Thank you, gentlemen.

Senator HART. Thank you very much for your willingness to give us that background.

Senator MOSS. It was very helpful.

(The map referred to follows:)



Senator HART. I am advised that those who were scheduled and who have come prepared to testify have now been heard. Here is a resolution from the Municipal Electric Association that has just been presented to me.

(The resolution referred to follows:)

RESOLUTION OF THE MUNICIPAL ELECTRIC ASSOCIATION OF MASSACHUSETTS

Whereas the general application of Federal Government policies with respect to the conservation of water resources and development of public power have never been generally applied in New England, even though the area shows a high density of population; and

Whereas in New England there exists very substantial opportunities for the further development of hydroelectric power and the conservation of water resources; and

Whereas the evidence of such need has been clearly established by various studies made by the Corps of Engineers, the Federal Power Commission, and other public agencies; and

Whereas it is generally conceded that the exploding population will greatly magnify these needs in the near future; and

Whereas the Municipal Electric Association of Massachusetts, representing 41 municipally owned electric plants having a total gross investment in excess of $50 million, serving more than 209,000 customers, and having annual gross revenues in excess of $28 million, is keenly concerned with the needs of the future generations, that association, at a regular meeting, on November 19, at the Hotel Bellevue in Boston, Mass., after discussion of the matter

Voted That the officers of the association present to the forthcoming hearing of the Senate Select Committee on Natural Resources, to be held in Boston on December 8, 1959, a resolution that the Federal Government be committed to further studies on the need for, and the extent to which, the water resources of New England be conserved and developed in the interest of the public and offer the suggestion that perhaps such need could best be fulfilled by the formation of a New England Water Resources and Power Authority, whose task and responsibility would be to define the need for the development of these resources, to point the way to which they could be best put to general use.

In accordance with that vote, the officers of the association present the following resolutions:

Resolution: That the Federal Government provide for the immediate development of the Passamaquoddy tidal power project, which project has recently been proclaimed by the Corps of Engineers as feasible, all in the interest of better serving the people of New England, and of the United States.

Resolution: That the Federal Government establish a Northeastern Power Administration, similar to the Southeastern and Southwestern Power Administration, to make a comprehensive study of New England's water resources, looking to the maximum orderly development of such resources in the public interest.

MUNICIPAL ELECTRIC ASSOCIATION OF MASSACHUSETTS,
JAMES E. BAKER, *Vice President.*

Senator HART. Finally, I should make clear that this meeting of the select committee in Massachusetts is the result of the specific invitation extended to the committee and a request made of the committee chairman by Senator John Kennedy.

Senator Kerr commented on the hospitality extended us. I shall not repeat that. But I want to thank all who contributed this substance to the record which began this morning with Mr. Sterling, who gave us a very useful and understandable background against which much of the testimony gained greater meaning as the day developed.

This closes the presently scheduled series of field hearings of the committee.

When these hearings began I was very uncertain whether the people in the East were really concerned and really interested in this business of our water resource. I have no doubt of it now. I did not have to go to Utah to know that the people of the high mountains traditionally regard this as absolutely essential to their survival.

I was not at all sure that we east of the Rockies or east of the Mississippi had that same attitude. We do not have the background that explains why the people of the West have a concern about water and feel it so strongly.

But there is no doubt in my mind now that the eastern regions of the country do recognize while we are not talking about trying to make green a sandy waste, we do realize that green places can become sandy if we do not do something about it now. This is the urgency that attaches to us in the East.

I am one of two members of the committee from a State east of the Mississippi River which again reflects the traditional attitude when the question of water resources developed. Not just to protect the Great Lakes water, but for other reasons I am delighted I am on the committee.

Again, thank you very much for a very, very helpful day. We are adjourned.

(Whereupon, at 2:20 p.m., Tuesday, December 8, 1959, the committee adjourned.)

(Subsequent to the closing of the hearing the following telegram and statement was received for inclusion in the record.)

WEYBRIDGE, VT., *December 8, 1959.*

U.S. SENATE SELECT COMMITTEE ON NATURAL RESOURCES,
Federal Court Building, Boston, Mass.:

Unable to attend your hearings today. Illness in family. Mailing my prepared material to Washington for incorporation in your final report.

ROBERT ALDRICH RODGER.

THE GREAT AMERICAN WATER SHORTAGE—A MENACE TO OUR DEFENSE PROGRAM, OUR INDUSTRIAL AND AGRICULTURAL EXPANSION, AND OUR POSITION OF INFLUENCE IN THE WORLD

(Statement by Robert W. Aldrich Rodger, Middlebury, Vt.)

We Americans are threatened with an emergent water shortage, nationwide in scope, which constitutes a menace to our industrial production, our agricultural expansion, our position of power and influence in the world, and to our defense program—all linked together in a common bond by their mutual dependence on an adequate supply of fresh, usable water, our most important natural resource because it is our most used raw material.

When we run out of clean, fresh water with which to meet the demands of industry, agriculture, and domestic needs, that will be the end of the road for us and all our activities. This is difficult to imagine, but many an ancient civilization has gone down to ruin through neglect of its water supply. Though we wonder at the stupidity of the ancients, we have displayed no greater intelligence in the development and conservation of our water resources.

The rapid expansion of population and industry has placed an ever-increasing drain on our water supply. We have already experienced drastic water shortages in many parts of the Nation, and our water experts tell us that we will have reached the limits of our fixed supply by 1980. The latest report of the Public Health Service states that we now have 66 critical shortage areas in the United States.

Despite the obvious urgency of the situation, we have failed to develop a coordinated, efficient administrative machine to handle the numerous Federal water activities. Starting 131 years ago with the original objective of improving navigation, Federal agencies now deal with the fields of irrigation, flood control, pollution control, water supply, fish and wildlife conservation, recreation, and every other phase of the water problem. Our Federal agencies were established, or assigned new functions, as programs evolved over the years and jealously guarded.

Sad to relate, it is on this group of antiquated agencies that the Nation must depend for the conservation and development of its water resources to meet the new demands of the space age. Every practical suggestion designed to modernize and streamline the water resources program has been ruthlessly attacked and defeated. They have necessarily cut across many established interests and practices. Power lobbies to defeat much-needed new legislation are maintained in Washington.

But time has caught up with the forces which have waged incessant war on the pollution-control program. The pollution of our surface waters has increased to such an extent that many large industrial users of water are forced to spend many millions of dollars to purify it before use. Also, thousands of municipalities are finding it impossible to utilize their local water supply because of pollution, and forced to import it at tremendous expense from points many miles distant.

Over the years public opinion has begun to crystallize around the two most important aspects of the water resources problem; namely, flood control and pollution control. Of the two, flood control has made the deeper impression on the public because of the dramatic consequences of floods. But, slowly and surely, the public has become fully aware of the even more costly ravages of pollution and there is a widespread demand for its control under Federal auspices. A wiser course would be to evolve a practical program carried out as a joint venture of Federal, State, and local governments, as overcentralization of authority in Washington would defeat the ends in view. (In the last section of this article we submit a plan for reorganization and a method of financing the program which involves no cash outlay on the part of the Federal Government.)

There are at least two causes which are thrusting the water resources problem into the spotlight. First is the lack of cash in Washington with which to meet the demands of the water-supply projects. The President has felt obligated to intervene with the suggestion that the financial responsibility for building sewage-treatment plants be shifted over to the States. The second cause is the war with Russia. Our success in either a hot or a cold war is entirely dependent on our industrial might. Everything used by the Armed Forces comes from our factories. Anything which handicaps their ability to produce automatically affects our defense program. Therefore, the emergent water shortage has a direct bearing on our ability to compete successfully with Russia in either the hot or cold war.

In the production of missiles, Russia has apparently caught up with our lead and even surpassed us in certain respects. In the cold war, the economic war, she is becoming a close second to us. Khrushchev boasted the other day that while the United States is still the richest and most productive nation in the world, "it is living the last years of its greatness." Why? "Because the U.S.S.R. will soon surpass the United States in production per capita."

To meet this challenge we must expand the productive capacity of our economy so as to provide an adequate national defense and meet the needs of our rapidly growing and increasingly urbanized population. We can't do this if our industries are hampered by a short water supply—and the quickest and cheapest way to insure that we have all the clean water we need is to control and abolish pollution.

There is one other way in which water plays a role in our international situation. It is purely psychological for the moment, but very real nevertheless.

Briefly, the backward nations of Asia and Africa are watching closely the race between us and Russia for industrial supremacy. Heretofore, they have always credited much of our successful development to our type of government, under which freemen have obviously flourished. But now Russia seems to be proving that quicker results may be expected under the Communist type of government.

So it has become a matter of vital interest to these nations to know which type of government will give them a better way of life the quicker, and help them achieve their strong nationalistic ambitions. They are firmly convinced that everything they long for so intensely can be secured by developing their industrial potentials. Russia understands this, and that is the big reason why she is striving so desperately to outstrip us in production. If she wins, these countries will become communistic and the vast markets of Asia and Africa will be controlled by Russia.

The production of missiles is of vital importance to maintain our retaliatory power in case of a hot war, but the expansion of our productive capacity is at the least of equal importance. Khrushchev has very cleverly tried to divert our attention from this. He has tried in every way to keep us so obsessed with the dangers from without that we are blind to those from within. He has achieved this by creating one apparent crisis after another, and if he can continue to keep up so frightened that we neglect our internal problems, he will eventually win his goal.

No one knows better than Khrushchev that a democracy such as ours is severely handicapped when fighting with a dictatorship. No department of government has power of absolute fiat. Only the people have the final consent, and it takes a long time to acquaint them with the facts. So if we are to win this struggle, the people must be made to realize that a small timid program, narrowly concentrated on strategic weapons, and the contraction of such basic internal problems as pollution control, is certain to defeat us.

The people have the right to learn about the nationwide water shortage and the ways in which it menaces our prosperity and security. Every reliable water expert assures us that we will have an abundance of fresh usable water if we rid our surface waters of pollution. For generations they, the people, have been taught to think of it as a community problem. They must be made to understand that it has become a national problem which must be handled on a national basis.

In conclusion, the foregoing statement represents an attempt to cover, as briefly as possible, the general aspects of our water resources problem. If any reader is skeptical about the existence of a nationwide water shortage, the factual data included in the following pages should provide satisfactory proof that the situation has not been exaggerated.

PART II

Factual data regarding the nationwide water shortage

Statistics make dull reading, but if you are at all interested in the water problem, you should at the least become familiar with the following facts and figures given in proof of its urgency.

All water experts agree that our water resources problem is one of making an ever-increasing demand, due to the rapid expansion of population and industry, fit into the limits of a fixed supply. This problem is being greatly augmented by the pollution of all our major sources of water with municipal and industrial wastes.

When the demand for fresh clean water exceeds the supply, as it has already in many parts of the Nation, the only way the needs can be met is by using the same water over and over as it flows from city to city and industry to industry. But to be suitable for reuse, the water must be of the right quality and in the right quantity. This requires that adequate pollution-control measures be provided and maintained.

It is generally agreed by all water experts that more new water can be provided by controlling pollution than by any other means.

Much publicity has been given to the use of sea water as a possible source of additional water. It has given many people the false impression that as long as we have the oceans to fall back on, there is not need to worry about a water shortage.

Someday, in the far distant future, salt water may become an important source of fresh water when we have learned how to desalinize it economically and treat it to get rid of the silt and waste matter running into it by the billions of gallons from our heavily polluted rivers.

But why build thousands of miles of pipelines, pumping stations, and salt-water-treatment plants with which to carry the water uphill back to the interior, when there is an abundance of fresh water close at hand for every purpose if we control pollution?

Even though we were to get all the fresh water needed from the ocean, it would still be necessary to rid our surface waters of pollution for hygienic, recreational, wildlife, nutritional, and many economic reasons. Furthermore, it may be several years before we learn how to extract fresh water from salt water on an economical basis in competition with fresh water obtained from sewage treatment of polluted fresh water. It would also take many years to get sea-water projects underway as it would require elaborate surveys, engineering studies, right-of-way lawsuits, condemnation proceedings, etc. The urgency of our water problem does not permit such delays. Undoubtedly, the use of sea water as a possible source of fresh water justifies the millions we are spending on research in that field but nothing justifies any further delay in our tackling the pollution problem on a nationwide basis.

That we have an abundance of fresh water for all uses, if we conserve and keep it clean, is proved by the following facts drawn from reports of the Public Health Service.

Each year so much water falls on the United States, and no more. This amounts to an average of about 30 inches. It follows that the Nation's fresh water is a fixed quantity. It averages about 4,300 billion gallons per day. Seventy percent of it, or 3,100 billion gallons, is returned to the sky each day by evaporation or transpiration. Of the remaining 30 percent, not all is available for use. A large proportion of this 1,200 billion gallons occurs as floodwater and runs off quickly into the ocean—gone before we have a chance to use it. We spoil a large proportion of what is left by pollution.

Experts have calculated that not more than 600 billion gallons per day of the water that falls on this country can be kept available for use in the Nation's lakes and streams. It is on this fixed fresh water supply that the continued growth and prosperity of the United States depends.

In 1900 we were largely a rural Nation and used only 40 billion gallons of fresh water per day. Today we are predominantly urban and our water use has risen to 270 billion gallons per day. And by 1980, only 21 years away, it is predicted that our fresh-water needs will be 600 billion gallons per day. Thus, in a little more than two decades we will have reached the limits of our daily supply.

But since our annual precipitation does not wall evenly over the country and is seasonal, we can't afford to wait 21 years before attacking the problem aggressively. Already we have 66 critical shortages. Last year one out of every four Americans had to get along without usable water and were forced to import it from distant sources.

The extent of the shortage is depicted by the Department of the Interior. In its annual survey of water conditions, it reported that supplies were low throughout the year over most of the southern two-thirds of the United States. In the Southwest and in the Northeast, water levels were at or near record lows. From Maine to California, literally rivers ran sluggishly and wells went dry. Some of the hardest hit States were Massachusetts, Connecticut, Pennsylvania, New Jersey, Virginia, Maryland, the Carolinas, Georgia, and a broad belt of the midlands running from Texas to Illinois and westward to Colorado.

The extent of the pollution problem

The Public Health Service estimates that there are at least 22,000 sources of pollution in the United States—11,600 municipal sewer systems, and 10,400 factory-waste outlets.

Despite the reduction of waste by 9,300 treatment plants—6,700 municipal and 2,600 industrial—the waste discharged into our surface waters equals that from 150 million people.

We need 6,686 more municipal sewage plants or additions, and 3,500 more industrial waste treatment plants or additions.

There are 7,000 other needs—1,600 municipal and 5,500 industrial—as yet unascertained.

Fresh water our most used raw material

Fresh water is the most used raw material by industry, agriculture, and domestic needs. For example:

The steel industry uses 13 billion gallons per day—65,000 gallons of water for every ton of steel. It takes 365,000 gallons of water to produce a ton of rayon yarn; and 500,000 gallons for 1,000 yards of woolen cloth. More than 1 million gallons are required to produce 1,000 barrels of gasoline.

In 1955 industry used 45 percent of the total water used by the Nation. It will use 65 percent in 1975.

Municipal water use will increase from 17 billion to 24 billion gallons per day by 1975.

In 1955 we were using 120 billion gallons of water per day for irrigation. In 20 years we will be using 170 billion gallons per day.

By 1975 we will have increased our use of water by 90 percent and by 1980 will have reached the limit of our supply and be using 600 billion gallons per day.

Conclusion

The foregoing data is based on estimates of the Public Health Service, the Department of the Interior, and the Department of Agriculture. These estimates are being constantly revised upward as estimates of population and production are revised. Thus, within the past few months the estimated population for 1975 was raised from 210 million to 220 million by the Census Bureau.

In the face of these figures, which should be well known in Washington, why is it that no practical measures are being taken there to modernize the water-supply program? Instead, we find that the President suggests restrictions on Federal spending in this field.

PART III

Sewage treatment works as a profitable national investment

Facts are emerging from research laboratories which raise great hopes for commercial gains from sewage treatment works. It is only a matter of time when economical methods of abstracting the valuable vitamins and minerals from sludge will be invented. This will give birth to a fabulous new industry giving employment to thousands, and sewage treatment plants will become profitable business ventures.

Scientific research into the biochemical mysteries of sludge, has disclosed that every ton of it contains at least $750 worth of vitamin B–12, and from $12,000 to $25,000 worth of amino acids. They have discovered that heat-dried activated sludge has several values as an additive to animal feeds.

The Metropolitan Sanitary District of Chicago, which covers an area of 900 square miles, treats sewage from the metropolitan area to the highest degree possible. At present it is all sold to the fertilizer industry. Other large cities in the United States are doing the same.

The tendency is to measure the need for water pollution control on the basis of its costs rather than its benefits. Usually this is because many people have the misconception that sewage treatment costs too much and only benefits the fellow downstream. This is contrary to all known facts.

Actually, sewers and sewage treatment are the cheapest of all public utilities. There are few products or services today that boast of costing only a nickel. But sewage treatment for the average family costs less than 5 cents a day—less than a candy bar. This is a small price for protecting our health and giving us all the other blessings derived from an adequate supply of good clean water.

However, though the cost of sewage and waste treatment is only a few pennies, there is a real possibility that it will cost nothing to the town and even declare a dividend when the sale of sludge is commercialized. In addition to this, there are incalculable values that can be salvaged from sewage and waste products and returned to our depleted soils. There is neither time nor space to discuss this aspect of the problem and the reader is referred to many fascinating books written on the subject.

PART IV

Some of the obstacles in the path of the pollution control program

Organized opposition.—We have never been able to inaugurate a comprehensive, closely knit, pollution control program because every effort to do so has met with stiff and effective opposition from otherwise responsible and representative groups with powerful lobbys in Washington. Their hostility is not based on scientific grounds, but on fear that they will be subject to greater expense in the disposition of their waste products, or added taxes. Community opposition is based on much the same grounds. In every case it arises through failure to measure the benefits of clean water as opposed to its costs.

Reorganization proposals also meet with suspicion and lack of cooperation in the numerous agencies and bureaus concerned with the water supply. They are jealous of their traditions and prerogatives. Because of their knowledge of the water supply problem, they should be able to devise a practical program. But like the Army, the Navy and the Air Force, they are unable to act in concert. Only the President can cut that Gordian knot and he has shown no disposition to do so.

Financial obstacles.—"Money is the root of all sewage works," said Morris M. Cohn, editor, "Wastes Engineering." It is not only the root, but it is the lack of cash or credit which has always been the chief obstacle in the path of sewage works construction. Small or large, every community in the country is overburdened with local, State, and Federal taxation. Consequently, tax dollars for sewage works meet with strong competition from tax dollars for competitive projects such as new schools, airports, libraries, highway construction and maintenance, and the many other needs of a modern municipality.

Most of the communities requiring sewage works are small. Of the 6,686 sewage plants needed, nearly half, or 3,195 are for communities under 1,000 population in size, and 1,795 more must be built in communities having a population of 1,000 to 2,500. It is these small villages which constitute the heart of the sewage problem.

In his attempt to get the States to finance sewage works treatment plants, the President has ignored the fact that everywhere in the Nation there is a dearth of State money for every phase of the water resources problem. This is especially true of the poorer States. In 1957, 25 States and Territories had appropriations of less than $50,000 and 10 were under $20,000. One State had no appropriation at all for water pollution control.

Since the early 1930's, the Federal Government has been slowly developing a policy of limited financial assistance to States and communities for sewage works and other aspects of the water resources program. These grants-in-aid have stimulated construction and whatever progress has been made can be credited to them. The 30 percent grant-in-aid which Washington is now advancing communities for sewage treatment works has galvanized many a dormant situation into being. But it is very far from being enough to start a nationwide construction program. This will require billions instead of millions to get it rolling fast and big enough to meet the needs of the situation.

Our water experts tell us that the outside cost of a thorough, nationwide attack on the pollution problem will be about $12 billion. This is obviously too great a financial burden for the communities and States to bear. Only Washington can assume so vast an expenditure—and spread its cost evenly over the Nation by taxation.

The pollution problem is in the same category as the superhighway problem; that is, too big for the States and communities. But if the Nation can finance a $50 billion superhighway problem, it surely can finance a $12 billion pollution control program. There is great need for highways but a much greater need for pollution control because of its basic relation to public health, recreation, wildlife, industrial and agricultural expansion, and to our defense program.

Those who decry such vast expenditures by the Federal Government fail to realize that money spent for sewage treatment plants is a national investment in productive goods which will expand our national income.

We are the richest Nation in the world and have plenty of money to satisfy every basic need; that is, if Congress refuses to yield to political considerations and expediency when spending our money. Thus it is generally conceded that Congress has thrown away billions of dollars on the farm program—without greatly benefiting the farmers. The same can be said of the veterans' program, the welfare program, and the numerous pork barrel projects.

If Congress were to slice an even billion dollars from each of these programs, it would save the Nation $4 billion annually. With this money it could allocate $1 billion annually to pollution control and clean up that mess in 12 years. The remaining $3 billion could be expended on the missiles program and on reducing the national debt. This may seem to be an oversimplification of the problem but something like this must be done if we are to avoid financial disaster. We can't afford any longer to throw the people's money down the drain on unproductive programs. Every dollar spent must be scrutinized in the light of the emergency if we are to win either the hot or cold war.

Legal obstacles.—There is a great lack of adequate laws dealing with the pollution control problem—local, State, and Federal. Many communities and States lack modern sanitary codes and laws restricting the development of new sources of pollution. Many towns are unable to build sewage treatment plants because they are not permitted by law to borrow for same outside the limits of their bonded indebtedness, as they can do in most cases for waterworks.

It would take many years to remove all the legal obstacles in the path of a nationwide pollution control program. The quick and effective way to do it would be to revise the 1948 Federal act to provide uniform regulation and enforcement, without the requirement of community or State consent—at least wherever polluted streams are within the jurisdiction of Congress.

Lack of advance planning seen as an obstacle.—Lack of planning for the future is a key problem in every community. This is particularly true of the preliminary planning phase, which on many types of projects can be most troublesome and time consuming. It takes many months of preliminary work before a sewage works project can be presented to the voters for intelligent consideration. Without detailed plans and specifications, firm estimates of cost of construction and operation, selection of site, etc., it is impossible to progress.

The Federal Community Facilities Administration will advance the full cost of these studies to any community interested in building a sewage treatment plant. There is no interest on the loan, which is only repayable if and when construction starts.

A Federal act, making advance planning mandatory, is badly needed. Experience proves that when towns have this type of information avaliable, it is only a short step to construction.

Lack of centralized authority a big obstacle.—There are 25 Federal agencies, 18 bureaus, and 16 congressional committees concerned with various phases of the water supply problem. Whereas, what is needed is a single authority. Spordic action by isolated communities, or States, will never give us the streamlined program required by the national emergency.

In the last part of this article, suggestions are made covering the reorganization of the Federal program.

The unbalanced budget and inflation seen as obstacles.—Considerable apprehension has been felt by those interested in pollution control, that the sharp increases in defense spending, and efforts to balance the budget, might have the effect of curtailing or eliminating, Federal grants-in-aid for sewage treatment works. This fear is justified by at least two reasons, namely:

> First: Neither the President nor Congress has given any indication that they regard the pollution of our surface waters as a menace to our defense program. They still think and talk about it as if it were a community and State problem, and not a vital, urgent Federal problem.
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> Second: In his effort to balance the budget, the President has personally sponsored a drive to return to the States certain programs, which they now underwrite jointly with the Federal Government. One of these is the sewage works construction program, to which Washington is now contributing $50 million annually.

At the last Governors' conference the delegates turned down the President's proposal as being impracticable, unfair to the poorer States, and because the Federal policy of grants-in-aid is beginning to produce results.

In respect to the first point, it is not surprising that they act on this assumption. For the last 50 years every conservation group and most public officials concerned with the water problem have preached the doctrine of community and State responsibility for pollution control. This conception was formulated before the rapid urbanization and industrial expansion of this country—at a time when we were largely an agricultural society. The idea has stuck with us, and because of it, we have failed to see how the water problem has grown to nationwide proportions and can only be solved on a national rather than a com-

munity basis. Unless we abandon this horse and buggy days concept, we will shortly be in for a rude awakening.

The second reason—no one questions the advisability of curtailing Federal spending on unnecessary programs, or on programs which can be taken care of by the States or communities. But there are obviously some programs which are too big for them to handle. These have developed in response to the demands created by the expansion of our national economy and the increase in population. We Americans, today, hold many radically different views from those held by our forefathers. The Civil War established Federal supremacy, in the sense that the States are units of the Federal structure. The 16th amendment gave the Federal Government unrestricted power to levy an income tax, and therewith the economic power to carry out vast projects. A great deal of the legislation passed by Congress and upheld by the Supreme Court has contributed to the growth of a strong central government. Federal control of our natural resources is an example of this trend, which has met with general approval.

Whatever our personal opinion of this trend may be, it is obviously here to stay. The problem facing us is how to keep it within bounds and functioning so as to reflect the best national interests. This can be done by reserving to the States those broad areas in which they can function efficiently, and the areas outside these fields to the Federal Government. Thus, we can thank God that we have a strong central government to deal with the problems created by the hot and cold war, to build needed superhighways, and other basic internal needs beyond the capacities of the States and communities. A nationwide sewage treatment program lies in this category because it will never be accomplished if left to the communities or States.

Federal spending for sewage treatment works is not inflationary (like spending for missiles) because it is an investment of our money in something productive which will add greatly to the national income. Sewage works are self-sustaining and self-liquidating. When they convert polluted water into clean, usable water, they are producing our most used raw material of which we are in short supply—and which would otherwise be lost to us and run off into the ocean along with a lot of valuable vitamins and minerals needed by our depleted soils.

The construction of $12 billion worth of sewage plants will also give employment to thousands of workers on and off the job.

A nationwide Federal sewage works construction program will add about $12 billion worth of capital assets to our economy from which it will benefit in many ways for years to come.

G. E. McCallum, Chief of the Water Supply and Water Pollution Control Program, Public Health Service, estimates that pollution is costing the Nation over $1 billion annually. This is a dollar and cents estimate, just how much it is really costing the Nation in intangible values can never be told. It is losses of this kind which feed inflation. The money lost by pollution, if salvaged, would pay the entire cost of the pollution control program in a period of 12 years.

To conclude, there are many ways to achieve a balanced budget and fight inflation without resorting to cuts in basic national programs. That these are not being resorted to makes it crystal clear that there is great need for new policy making arrangements which more effectively reflect national interests.

During the last 50 years the people have become conversant with the necessity of conserving their great natural resources. But we lack leaders like Theodore Roosevelt and Amos Pinchot to galvanize them into action. If and when they learn that their prosperity and security are seriously threatened by pollution, they will somehow do something about it—just as they did about the lag in the missiles program.

However, we need not despair because we have men in Congress who are familiar with the problem. They are men of stature and conviction who possess insights into problems of this type and they will be able to mold Federal policies in the right direction before it is too late.

PART V

Suggestions on how to organize a practical water resources program

After 50 years of debate on the subject, we still lack an effective water resources program. It is a sad commentary on our inability to deal realistically

with our internal problems. The fruit of all our deliberation is a stew of conflicting interests and objectives, presided over by a large group of overlapping agencies and bureaus, acting under the abstruse terms of a heterogeneous mass of legislative enactments. (There are 25 Federal agencies, 18 bureaus, and 16 congressional committees concerned with the water problem). We have yet to formulate a water resources program which adequately reflects either the short or long-range national interests.

This is a surprising and totally unnecessary state of affairs in a Nation which has produced the greatest organizing geniuses in the world. The hodgepodge we refer to as our "water resources program" has obviously never had the benefit of their attention. Instead, it has been a political football from its inception. Expediency and political considerations have controlled its growth—and not in the best interest of the Nation as a whole.

Until Congress and the President learn how to evaluate the water problem on the basis of its general as well as its particular aspects; and reach decisions regarding it on the basis of its benefits rather than its costs, there can be no hope for progress commensurate with the needs—now so greatly enhanced by the cold war and rapidly emerging water shortage.

In its particular aspects, the water problem is one of many technological hydrologic complexities. Scientific research and hydrologic engineers have solved many of these problems but much work remains to be done in this field. There are also innumerable problems of a political, social, and economic character which rekuire determination. Immersed in these important details, our water experts and authorities have not always evaluated them in terms of their relative importance. Thus, the tendency has been to lose sight of the main objective which is to give the Nation an adequate supply of usable water wherever and whenever needed.

In its general aspects, the water problem is relatively simple, but it is here that we have failed most conspicuously. As in any vast commercial enterprise, the business of water supply has several major component parts; such as pollution, erosion, flood control, irrigation, and navigation. If we had thought of our water supply as a production problem of a vast business enterprise, we would never have placed the administration and policymaking authority in the hands of a conglomeration of agencies and bureaus—which is like putting 59 Kilkenny cats in a bag.

On the contrary, regarding it as a business enterprise, we would have placed its administration in the hands of one man—Secretary of Water Resources, with a place in the Cabinet. An Under Secretary would have charge of each of the major aspects of the problem. These men would all be the type of men who possess insight into the general conduct of the business which men of highly specialized experience generally lack. They would bear the responsibility of directing and coordinating the activities of the specialists and their assistants.

This is the proven method which has enabled men with a genius for organization to relate many differing problems into a going, successful operation. It may seem to be an oversimplification of the measures which must be taken if we are to get the water program down on the ground. But experience has proved over and over again that all problems are simple in essence and complex in detail.

Since the policymaking branch of the Federal Government is the executive, the final responsibility for devising a practical water program rests with the President. He has ample authority to concentrate authority and mobilize a streamlined program. By means of fireside chats he can inform the public about the urgency of the water problem because of the cold war. He, alone, can make them understand that the nationwide water shortage is a menace to their prosperity and security, and thus galvanize them into support of a sound water program.

It would be misleading to minimize the task. If we were not faced with an emergency, it would be an almost impossible task. Any proposal is certain to meet with stiff opposition because it must necessarily cut across parochial interests. It will be difficult to get Congress to pass the needed new legislation. However, if the people are given the undiluted truth about the water problem by someone they trust, they will somehow do something about it.

In conclusion, a word of warning—as the New Dealers learned in the case of housing, overcentralization of authority in Washington just don't work. This is a job requiring the joint efforts of local, State, and Federal authorities. The

program will bog down if too much detail has to be channeled through Washington. The Federal Government should play a supporting role, doing only that which the States and communities are not equipped or able to do. Judging by experience, the most important contribution it can make is in the field of financing with just enough general control to insure a coordinated, dynamic, nationwide program. Thus, great care must be taken to recognize, protect and preserve the primary responsibilities of the States in preventing and controlling water pollution. Nothing should be done that will interfere with States rights over their surface waters, or deprive them or their communities of the basic control of construction and operation of projects.

So far, no mention has been made of the State water resources agencies. With few exceptions they are all badly in need of reorganization and financial assistance. Since the success of the program largely depends on their intimate knowledge of local conditions and upon their ability and willingness to cooperate with the Federal program, it is clear that this phase of the water problem will require considerable attention. The principles underlying a sound reorganization of the Federal agencies apply with equal force to the organization of State agencies.

PART VI

How to finance sewage treatment works without any cash outlay by Washington

Next to a sound reorganization plan, the most important problem is that of financing the program. It is clear that neither the States or communities are able to assume so vast a responsibility and that only Washington is in a position to do so. But money is scarce there for every purpose and any proposal for additional spending will be closely scrutinized and strongly opposed no matter how worthy.

However, there is a way in which the water resources program can be financed without involving the Federal Government in any cash outlay—at least in connection with the construction of sewage treatment plants. This should be given immediate consideration. We will now outline its essential features in the hope that the Federal economists and banking institutions will ponder on its merits.

The financial situation in Washington today is similar to that which prevailed in the early days of the New Deal. Thus there are many things which should be done but little money with which to do them. The New Dealers planned the construction of billions of dollars worth of large scale housing projects but had only millions with which to implement their projects. At that time the mortgage lending institutions were bulging at the seams with gold but were afraid to make loans until they were satisfied that all the water had been wrung out of existing mortgages. Out of this impasse came the Federal mortgage insurance principle (FHA) whereby the banks made loans on which the Government assumed only a contingent liability. When this agreement was reached, the banks released their gold, the Government's projects burgeoned, and the national recovery got underway.

While sewage treatment plants are not housing, they are a capital investment, of a community, which is self-liquidating and self-sustaining. They are a much safer investment than speculative housing because all costs and income are based on minimum estimates. Promotion fees and excessive builders profits are not included. Absent too are the customary bonuses, discounts and subordination features to be found in the most conservative speculative housing project. The revenues to meet the fixed charges are not based on inflated market values but on a minimum basis sufficient only to meet the fixed charges, pay for maintenance and operation, and set up adequate reserves for depreciation and obsolescence. In other words, it is a nonspeculative project rigged to meet every storm of adversity from its very inception. The bonds of these projects are unusually secure.

In some parts of the country sewage treatment plants have been built by private enterprise and operated at a profit. Some day, in the not distant future, when we have learned how to separate the valuable vitamins and minerals from the sludge on an economic basis, it is fair to assume that sewage works will become profitable public business ventures.

It is a mistage to always think of Federal financial assistance in terms of a cash advance or grant-in-aid. As we have seen in case of the Federal Housing Administration, the assumption by the Government of a contingent liability on mortgage loans was sufficient inducement to the lending institutions to put their

money to work. The same principle can be employed to encourage highway construction, bridges, sewage treatment works, etc.

Its investment bankers and mortgage lending institutions can be induced to make 100 percent loans on sewage treatment works, if fully insured by the Federal Government, we will have eliminated the chief obstacle in the path of pollution control. We suggest that the Federal economists and bankers get their heads together and look into the feasibility of this idea. Bankers should be receptive as they are always on the lookout for new fields of secure and profitable investment.

That we may not have to wait long for this is indicated by the fact that last January, Representative Broomfield of Michigan, introduced a bill, H.R. 2733, to provide for a program whereby the Federal Government may guarantee bonds issued by States and municipalities in carrying out construction programs for certain public sanitary facilities including sewage treatment works.

One thing is certain, if we wish to avoid state capitalism where, as in Russia, the Government supplies the capital for all enterprise, we must return to our former practice of financing projects through our investment banking institutions.

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